

1 of money and effort.” My understanding of the Commission’s policy of prudent avoidance  
2 is that the process of routing a proposed transmission line should include consideration of  
3 routing options that will reasonably avoid population centers and other locations where  
4 people gather. This does not mean that a proposed transmission line must avoid habitable  
5 structures at all costs, but that reasonable alternatives should be considered.

6 **Q. DO YOU BELIEVE THAT THE 25 FILED ROUTES IN THE APPLICATION**  
7 **COMPLY WITH THE COMMISSION’S POLICY OF PRUDENT AVOIDANCE?**

8 A. Yes. In my professional opinion, the primary alternative routes and segments presented in  
9 the Application and EA conform to the Commission’s policy of prudent avoidance in that  
10 they reflect reasonable investments of money and effort in order to limit exposure to  
11 electric and magnetic fields.

12 **Q. HAS POWER REVIEWED AND CONSIDERED MITIGATION MEASURES**  
13 **PROPOSED BY LCRA TSC AND AEP TEXAS FOR THIS PROJECT TO**  
14 **DECREASE POTENTIAL IMPACTS FROM THE PROPOSED LINES?**

15 A. Yes, mitigation measures for the Project are described in Sections 1.3, 1.4, 1.5, 1.6, and 4.0  
16 of the EA.

17 **Q. WHAT ARE POWER’S CONCLUSIONS REGARDING THESE MITIGATION**  
18 **MEASURES?**

19 A. Where applicable and practical, the proposed mitigation measures should mitigate the  
20 potential adverse effects of construction and operation of the Project to an appropriate  
21 extent.

## 22 **VI. SUMMARY AND CONCLUSIONS**

23 **Q. PLEASE SUMMARIZE YOUR TESTIMONY.**

24 A. I have personally reviewed all of the primary alternative routes and their constituent  
25 segments, and determined that they are environmentally acceptable, have been routed in a  
26 prudent manner, and comply with PURA and the Commission’s rules, policies, and  
27 procedures for transmission line routing. All of the primary alternative routes and segments  
28 in the Application are viable, feasible, and acceptable from an environmental standpoint.

1    **Q.    DOES THIS CONCLUDE YOUR DIRECT TESTIMONY?**

2    **A.    Yes, it does.**



## LISA BARKO MEAUX

### PROJECT MANAGER/DEPARTMENT MANAGER - ENVIRONMENTAL SERVICES

#### YEARS OF EXPERIENCE

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#### EDUCATION

- M.S., Environmental Management, University of Houston, 2001
- B.S., Environmental Science, Texas A&M University, 1998
- A.S., Science, Houston Community College, 1995

#### AREAS OF EXPERTISE

- Project management
- Schedule and budget management
- State utility siting applications
- Expert testimony
- Environmental planning
- Routing and siting studies
- Environmental studies and documents
- Environmental compliance, approvals, permits, and strategy
- Public involvement and agency coordination

#### SPECIAL TRAINING

- OSHA/RCRA Hazmat Training, Texas A&M National Spill Control School

#### HARDWARE/SOFTWARE

- Microsoft Project
- Adobe Workshop
- Oracle MIS

#### AFFILIATIONS

- Texas Association of Environmental Professionals
- Gulf Coast Power Association

#### EXPERIENCE SUMMARY

Lisa Barko Meaux is an environmental scientist and veteran POWER project manager with detailed, thorough knowledge of the planning, technical, regulatory and managerial aspects of the utility industry. She has a formidable background in siting and routing electrical transmission lines in Texas, and has also worked across the nation. She is skilled at finding cost effective, timely approaches for compliance and coordination with local, state and federal agencies. She has organized and participated in various public involvement programs and has conducted and led the resulting public input analysis and interpretation. She has prepared written and delivered oral expert testimony on behalf of contested linear projects.

Her compliance responsibilities have included obtaining necessary permits and clearances for energy-related projects, primarily linear routing studies, and overseeing and coordinating report preparation of environmental assessments, Certificates of Convenience and Necessity (CCN) Applications, Phase I Environmental Site Assessments (PIESAs) in accordance with ASTM standards, Spill Prevention Control and Countermeasure Plans (SPCC), Storm Water Pollution Prevention Plans (SWPPP), natural resource assessments (NRAs) and coordination of archeological surveys.

#### LCRA TSC/AEP Texas, Bakersfield to Solstice 345 kV Transmission Line, Texas

POWER performed data collection, resource analyses and prepared an environmental assessment (EA) and alternative route analysis report for LCRA TSC and AEP Texas' proposed Bakersfield-Solstice 345 kV transmission line in Pecos County, Texas. This project is part of the Far West Texas Project and was recently designated as critical by the Electric Reliability Council of Texas (ERCOT) in order to support increased growth and energy demand in west Texas. The project will include an approximate 70 to 90 mile double circuit 345 kV transmission line depending on the route approved by the Commission. POWER supported the public involvement phase of the project and contributed to preparation of the Certificate of Convenience and Necessity (CCN) for submittal to the Texas Public Utility Commission (PUC), and is providing written expert testimony to accompany the application. Unique issues of this project include oil and gas development in the project area, and close proximity to wind and solar farms, a VORTAC Facility and the Fort Stockton-Pecos County Airport. The joint application will be filed in November 2018.

### **LCRA Transmission Services Corporation, Mountain Home 138 kV Transmission Line Routing Study, Texas**

Project Manager responsible for technical oversight, client relations, public outreach, project reporting and document preparation. LCRA Transmission Services Corporation (LCRA TSC) is proposing to build and operate a new single-circuit, 138 kV transmission line in Gillespie, Kerr, and possibly Kimble Counties, Texas. The project will connect the existing Hunt Substation, the new Mountain Home Substation and the existing Harper Substation. Depending on the final route selected, the project will be up to 20 miles long. With input from LCRA TSC, POWER identified preliminary alternative route segments and presented the results at one public open house meeting in June 2018. A second open house meeting is scheduled in November 2018. POWER will prepare the project environmental assessment (EA) in support of the Certificate of Convenience and Necessity (CCN) document for filing with the Public Utility Commission of Texas. POWER will support the hearing phase of this project and provide expert testimony if required. The CCN application is scheduled to be filed in spring 2019.

### **LCRA Transmission Services Corporation, Leander-Round Rock 138 kV Line Routing Study, Texas**

Environmental Project Manager responsible for preparing an environmental assessment and alternative route analysis report for LCRA Transmission Services Corporation's Leander-Round Rock 138 kV transmission line located in Williamson County, Texas. The project consists of constructing a new 138 kV transmission line along an approximate 12-21 mile section between the existing Leander Substation and the existing Oncor Round Rock Substation. The project also includes two substation siting areas for two new substation locations. Unique issues of this project include potential karst features, the Jollyville Plateau Salamander, historical and archeological site density, and the compatibility of the proposed line with existing land uses within a rapidly developing area. POWER supported two public meetings and responded to requests for information. POWER also attended the hearing on the merits and provided expert witness testimony. This project was approved in June 2017.

### **LCRA Transmission Services Corporation, Zorn-Marion 345 kV Line Routing Study, Texas**

Environmental Project Manager responsible for preparing an environmental assessment and alternative route analysis report for LCRA Transmission Services Corporation's Zorn-Marion ERCOT Critical 345 kV transmission line located in Guadalupe County, Texas. A portion of the new transmission line will utilize the open position on the existing double-circuit capable Gilleland Creek-Clear Springs transmission line (T-511) between the Zorn and Clear Springs substations. Services included tasks required to support the preparation of the CCN document for filing with the Public Utility Commission of Texas (PUCT or Commission); data acquisition and analysis, conducting a routing study and preparation of an environmental assessment, exhibits and support staff for a public meeting, and expert witness support. The hearing on merits for this project was in June 2016 and was approved in September 2016.

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**LCRA Transmission Services Corporation, Blumenthal Substation and 138 kV Line Routing Study, Texas**


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*Environmental Project Manager responsible for preparing an environmental assessment and alternative route analysis report for LCRA Transmission Services Corporation's Blumenthal 138 kV transmission line located in Kendall and Gillespie counties, Texas. The project consists of a new substation proposed in the vicinity of US Highway 290 and Luckenbach Road and construction of a new approximate 10-15 mile 138 kV transmission line between the new Blumenthal Substation and an existing LCRA TSC 138 kV transmission line. Unique issues of this project include the compatibility of the proposed line with existing agricultural land use including peach orchards and vineyards/wineries, visibility to tourists, consideration of a Federal Aviation Administration Very High Frequency Omnidirectional range navigation facility, and avoidance of potential habitat for federally listed bird species. The CCN Application for this project was filed in October 2014. POWER provided written direct testimony, responded to RFIs and developed rebuttal testimony. The hearing on merits was held in May 2015.*

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**LCRA Transmission Services Corporation, Cushman to Highway 123 138 kV Transmission Line EA, Texas**


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*Project Manager responsible for technical oversight, client relations, public outreach, project reporting and document preparation. POWER prepared the environmental assessment and alternatives analysis (EA) document for a new seven-mile, single-circuit 138 kV line. The document supports LCRA's Certificate of Convenience and Necessity (CCN) application for filing with the Public Utility Commission of Texas. Tasks included data acquisition and analysis, preliminary alternatives identification, exhibits and support staff for a public meeting, public input analysis, and preparation of the EA. POWER responded to requests for information and provided expert testimony.*

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**LCRA Transmission Services Corporation, EC Mornhinweg to Parkway 138 kV Transmission Line EA, Texas**


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*Project Manager responsible for technical oversight, client relations, public outreach, project reporting and preparation of the EA. POWER prepared the environmental assessment and alternatives analysis (EA) document for construction of a new 138 kV transmission line. The document supports LCRA's Certificate of Convenience and Necessity (CCN) application for filing with the Public Utility Commission of Texas. POWER provided data acquisition and analysis, preliminary alternatives identification, exhibits and support staff for a public meeting, public input analysis, and preparation of the EA. The study area included agricultural land, pastures, residential subdivisions and commercial properties. POWER responded to requests for information, prepared written expert testimony, and attended the hearing on merits; however, this project was settled without a full hearing.*

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**LCRA Transmission Services Corporation, Manchaca to Friendship 138 kV Underground Line, Texas**


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*Project Manager for the environmental planning tasks associated with the underground portion of a proposed 138 kV transmission line. Identified the required environmental permitting and clearances necessary to construct the underground portion of the project. Selected and coordinated with a*

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geophysical subcontractor firm to conduct a Ground Penetrating Radar (GPR) and Electric Resistivity survey of the proposed right of way. Coordinated the environmental subsurface survey logistics, data collection and data interpretation with input from LCRA. The project is located within the Edwards Aquifer Recharge Zone in Hays and Travis counties, Texas. The purpose of the survey was to evaluate karst features such as air-filled caves and solution cavities that might affect the design and construction.

#### **AEP Texas, Three Rivers-Borglum-Tuleta 138 kV Transmission Line, Texas**

Project Manager responsible for technical oversight, client relations, public outreach, project reporting and document preparation. POWER recently conducted the routing study and prepared the environmental assessment (EA) to support a Certificate of Convenience and Necessity (CCN) amendment for AEP Texas' Three Rivers-Borglum-Tuleta 138 kV Transmission Line Project, located in Bee, Live Oak, and Goliad Counties, Texas. The project is divided into two segments at the proposed Borglum Substation. Working closely with AEP Texas, POWER identified preliminary alternative route links for each project segment and presented the results at two public open house meetings. Considerations of the project included compatibility with existing land use in the area, proximity to the City of Beeville, multiple airports/airstrips and a prison, and the potential for a rebuild of a portion of the project. POWER will support AEP Texas through the hearing phase of the project and will provide expert testimony if required. The application is scheduled to be filed in fall 2018.

#### **Quanta Electric Power Construction, LLC Wind Catcher Energy Connection Project, Oklahoma**

Environmental Project Manager responsible for technical oversight, client relations, public outreach, project reporting and document preparation. American Electric Power (AEP) and its subsidiary companies, Public Service Company of Oklahoma, and Southwestern Electric Power Company, are proposing to construct the Wind Catcher Energy Connection (WCEC) Project. Depending on the final selected route, the project would span approximately 380 miles from the proposed Wind Catcher Windfarm located in Cimarron and Texas Counties, Oklahoma, to a proposed substation located near the City of Tulsa, Oklahoma.

AEP contracted Quanta Services, Inc. (Quanta) as the Engineering, Procurement and Construction (EPC) contractor along with its subsidiary companies, QPS Engineering, LLC to complete environmental permitting and assist with public relations; Dashiell Corporation to provide engineering design for the power line; and North Houston Pole Line to provide construction management. Quanta also included service specialty subcontractors who served as active members of the siting team to provide input during the alternative route development, public involvement, and alternative route comparison phases of the Siting Study, which culminated with the selection of the preferred route. These specialists included POWER, to facilitate the siting study, and Coates Field Service, Inc. for Right-of-Way acquisition. Siting specialists from AEP and public relation specialists from Saxum were also key members of the team.

POWER was responsible for conceptual route refinement, data collection and analysis, field reconnaissance, constraints and opportunities mapping,

segment identification and refinement, open house support, alternative route identification, refinement, data tabulation, and comparison. Our siting team members and GIS staff supported 17 public open house meetings and were responsible for public input analysis and recommendations to the siting team. The team met multiple times and collaboratively identified a route proposed for construction. The siting study was scheduled for completion in fall 2018 but the project was cancelled in late July 2018.

#### **Brazos Electric Cooperative, Inc./AEP Texas, Inc., Benjamin 138 kV Transmission Line Project, Texas**

Project Manager responsible for technical oversight, client relations, public outreach, project reporting and document preparation. POWER finished conducting the routing study and the environmental assessment to support a joint Application of Brazos Electric Power Cooperative and AEP Texas to amend their certificates of Convenience and necessity for the Benjamin 138 kV Transmission line in King and Knox Counties, Texas. POWER along with Brazos Electric and AEP Texas identified preliminary alternative route links that were presented at one public meeting. The application was filed in November 2017. POWER supported Brazos Electric and AEP Texas in the Hearing Phase of this project by providing written direct expert testimony. A unanimous agreement was reached and approved in August 2018.

#### **American Electric Power, Tuleta to Euler to Coletto Creek 138 kV Transmission Line, Texas**

Project Manager responsible for technical oversight, client relations, public outreach, project reporting and document preparation. POWER recently finished conducting the routing study and the environmental assessment to support a CCN amendment for AEP TCC's 138 kV Tuleta to Euler to Coletto Creek Transmission Line project, located in a Bee and Goliad counties, Texas. The project was divided into two segments at the Euler Substation. POWER along with AEP TCC identified preliminary alternative route links for each project segment that were then presented at three public meetings. The application was filed in July 2015. Considerations in this project included the compatibility of the project with the Navy Outlying Goliad Airfield, T&E species, and a historical district. POWER supported AEP TCC in the Hearing Phase of this project and provided expert testimony. The Project was approved in early July 2016.

#### **American Electric Power, Rio Grande LNG Interconnection Project EA & Route Analysis, Texas**

American Electric Power is amending its Certificate of Convenience and Necessity (CCN) in order to certify a new 138 kV single circuit transmission line (double circuit capable) in Cameron County, Texas. The Rio Grande LNG Interconnection Project (Rio Grande Project) will connect the proposed Pompano Substation with AEP's existing transmission system at an identified cut-in location along an existing 138 kV line. The line will be approximately 7 to 10 miles in length depending on the route approved. The proposed study area is based on the project endpoints and the need to provide a set of geographically diverse alternative routes that provide options to the public and the Commission. Support tasks include data acquisition and analysis, conducting a routing study and preparation of an environmental assessment, and support with preparation of the CCN application and

outlined post filing activities. The project is currently on hold.

#### **American Electric Power/Electric Transmission Texas, Heartland-Yellowjacket 138 kV Transmission Line Project EA & CCN, Texas**

AEP TNC/ETT amended its Certificate of Convenience and Necessity (CCN) to certify a 138 kV capable transmission line proposed in McCulloch and Menard Counties, Texas. The proposed study area is based on the project endpoints and the need to provide a set of geographically diverse alternative routes that provide options to the public and the Commission. The services requested include preparation of the EA in support of the CCN document for filing with the Public Utility Commission of Texas (PUC or Commission). Tasks include data acquisition and analysis, conducting a routing study and preparation of an environmental assessment, support staff for the public meetings, and support with preparation of the CCN application. POWER supported AEP TNC/ETT in the Hearing Phase of this project and provided expert testimony. This project was approved in August 2017.

#### **American Electric Power, Del Sol to Jackie Howard 345 kV Transmission Line, Texas**

Project Manager responsible for technical oversight, client relations, public outreach, project reporting and document preparation. POWER conducted a routing study and prepared the environmental assessment in support of the CCN amendment to certify the double-circuit capable 345 kV Del Sol-Jackie Howard transmission line for ETT. The proposed line extends between the new Del Sol Substation and the proposed Jackie Howard Substation/Collection Station associated with the Los Vientos IV Wind Farm.

POWER's study identified a set of geographically diverse alternative routes to provide alternative routing options for approval by the Public Utility Commission. Other tasks include data acquisition and analysis, preparation of an environmental assessment document, and support with preparation of the CCN application. Expert testimony was not required because this project was settled without a hearing.

POWER coordinated with the Texas Historical Commission (THC) to satisfy the Texas Antiquities Permit requirements for a short portion of the approved project that crossed Texas General Land Office property. POWER performed a cultural resources survey of the property, prepared a report of the investigations for review by the THC.

#### **American Electric Power, Kenedy Switch Station–Tuleta 138 kV Routing Study, Texas**

Environmental Project Manager for a transmission line routing study. Due to reliability issues with increased load, AEP's Texas Central Company required a new line between the towns of Kenedy and Pettus. POWER conducted a routing study and prepared the environmental assessment in support of the CCN application for the 138 kV Kenedy SS-Tuleta transmission line project. The proposed line, designed for double-circuit capacity, will replace an existing 69 kV line. A key issue for routing this project was the compatibility of the proposed project with existing and planned land uses, specifically utilizing the existing 69 kV transmission line right of way with consideration to adjacent land uses. POWER's study

identified a set of geographically diverse alternative routes to provide options for the public and the Public Utility Commission, including use of the existing right of way. Other issues involved paralleling existing utility corridors, use of an abandoned railroad, state-owned lands within the study area, and the sensitivity of public opinion. POWER also performed data acquisition and analysis and supported a public meeting.

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**Electric Transmission Texas, Lobo to Rio Bravo to North Edinburg 345 kV Transmission Line, Texas**

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Project Manager responsible for technical oversight, client relations, public outreach, project reporting and preparation of the EA. POWER performed a siting study for an ERCOT critical new double-circuit capable 345 kV transmission line in the South Texas Region. The final approved route is 156 miles in length. POWER prepared the Alternative Route Analysis/Environmental Assessment Report and supported preparation of the application for a Certificate of Convenience and Necessity (CCN) to the Public Utility Commission of Texas (PUCT). Services included collection and analysis of study area data, development of a constraints map, identification of preliminary links, and participation in the public outreach program which included five public meetings over a two-week period. POWER then performed the public input analysis, revised the preliminary links, and compared and identified the alternative routes. POWER also provided expert witness testimony for this project. This ERCOT Critical project was settled.

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**American Electric Power, Esmeralda-Yucca Routing Study/Environmental Assessment, Texas**

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Project Manager for a new AEP electrical transmission line required to resolve reliability issues associated with load needs in Crockett County, Texas, primarily related to natural gas exploration. POWER conducted a routing study and prepared the environmental assessment in support of the CCN amendment to certify the single-circuit 138 kV Esmeralda-Yucca transmission line for AEP Texas Central Company. The proposed line will connect the proposed Esmeralda and the existing Yucca stations and will be approximately 15 miles long. UT Lands is the primary landowner within the study area. As a result, AEP and POWER are coordinating closely with UT Lands representatives and a public meeting is not required per Procedural Rule 22.52 (a)(4) since fewer than 25 landowners would be entitled to receive direct mail notice of the application. POWER's study identified a set of geographically diverse alternative routes to provide alternative routing options for approval by the Public Utility Commission. Other tasks included data acquisition and analysis, preparation of an environmental assessment document, and support with preparation of the CCN application. Key issues include the compatibility of the proposed project with existing and planned land uses, specifically ongoing and planned oil and gas exploration; paralleling existing utility corridors; and minimizing impacts to suitable habitat for the federally and state-listed black capped vireo within the study area. POWER performed modeling for potential endangered bird habitat within the area as part of the constraints identification process. This project was not contested.

**Sharyland Utilities LP/AEP, North Edinburg-Loma Alta, Texas**

Project Assistant in the initial phases for a joint transmission project between Sharyland and Electric Transmission Texas, LLC (ETT) in the Rio Grande Valley area in southern Texas. The ERCOT Critical double-circuit-capable 345 kV transmission line will be 80 to 125 miles depending on the route approved by the Public Utility Commission of Texas (PUCT). POWER prepared the Alternative Route Analysis/Environmental Assessment Report and supported preparation of ETT and Sharyland's application for a Certificate of Convenience and Necessity (CCN) to the PUCT. Work included collection and analysis of study area data, developing a constraints map, developing preliminary links, and participation in the public outreach program which included six public meetings, and alternative route development and analysis. POWER provided expert witness testimony support for this ERCOT Critical project.

**American Electric Power, Chisolm-Gracemont 345 kV Line Environmental Assessment, Oklahoma**

Environmental Project Manager for POWER's EA for the Chisolm-Gracemont transmission line. This project was modified per an agreement between AEP and OG&E regarding a joint interconnection point. All preliminary routing was modified to converge at a dead-end structure at a specified coordinate. Initially, AEP was proposing to construct a new 345 kV transmission line, approximately 93 miles long, which would have connected AEP's new Chisolm Station to OG&E's Gracemont Station located in Oklahoma. The proposed line was also located within three miles of the Southwest Power Station for a future connection, extending the project across portions of Beckham, Washita, and Caddo counties. Per the agreement between AEP & OG&E, POWER modified all routing options to end at a specific interconnection point which reduced the project length to approximately 60 miles with the revised preliminary alternative routes extending across Beckham and Washita counties. POWER's tasks include data collection, identifying a set of initial preliminary alternative corridors for development of the route links, field reconnaissance, an alternatives analysis, and development of an environmental assessment. Key issues concerning the study area include State Trust Lands, a regional airport that includes a licensed spaceport launch site, and a state park. Ecological concerns include the federally listed Whooping Crane (migratory flyway), Piping Plover, and the proposed Lesser Prairie Chicken. The project study area falls within tribal jurisdictional areas of several federally recognized Native American tribes.

**South Texas Electric Cooperative, Palmas to East Rio Hondo 138 kV Transmission Line, Texas**

Environmental Project Manager responsible for technical oversight, client relations, public outreach, project reporting and document preparation. POWER conducted the routing study and prepared the environmental assessment (EA) to support a Certificate of Convenience and Necessity (CCN) application for the South Texas Electric Cooperative, Inc. (STEC) Palmas to East Rio Hondo 138 kV Transmission Line Project in Cameron County, Texas. STEC is proposing to construct a new double-circuit capable 138 kV transmission line that will connect the proposed Palmas Switching Station site with the existing East Rio Hondo Substation. Depending on

which route is selected, the total length of the proposed project may be up to six miles long. POWER identified preliminary alternative route segments and presented the results at one open house public meeting. POWER also completed the public input analysis and conducted an alternative route comparison as part of the Routing Study/EA and CCN application document. POWER will continue to support the licensing phase of the project as required.

#### **South Texas Electric Cooperative, Tilden-Reveille 138 kV Transmission Line, Texas**

Environmental Project Manager responsible for preparing an environmental assessment (EA) and alternative route analysis report. POWER conducted the routing study and prepared the EA to support a Certificate of Convenience and Necessity (CCN) application for STEC's Tilden-Reveille 138 kV Transmission Line project. The CCN application was filed in September 2013. The project is an approximate 47-mile, 138 kV double-circuit transmission line connecting STEC's existing Tilden Substation and the proposed Reveille Substation. POWER identified preliminary alternative route segments and presented the results at two public meetings. POWER also completed the public input analysis and conducted an alternative route comparison as part of the Routing Study/EA and CCN application document. Our analysis included full consideration of the necessary requirements of Section 37.506(c)(4)(A)-(D) of the Texas Utilities Code, the Public Utility Commission of Texas (PUC) CCN application form, and PUC Substantive Rule 25.101. POWER also provided preliminary and detailed line engineering and support for expert testimony.

#### **PEC, Highway 32-Wimberley Transmission Line Rebuild and Upgrade Project, Texas**

Environmental Project Manager responsible for preparing an environmental assessment and alternative route analysis report for PEC's Highway 32-Wimberley transmission line located in Hays County, Texas. The project consists of rebuilding and upgrading an existing 69 kV transmission line along an approximate 5-mile section between the existing Highway 32 Substation and the existing Wimberley Substation. The services requested include preparation of the EA in support of the CCN document for filing with the Public Utility Commission of Texas (PUC or Commission). Tasks include data acquisition and analysis, conducting a routing study and preparation of an environmental assessment, support staff for the public meeting, and support with preparation of the CCN application. This project was approved in March 2018.

#### **CenterPoint Energy Electric Houston, LLC Bailey to Jones Creek 345 kV Transmission Lien Project, Texas**

POWER performed data collection, resource analyses and prepared an environmental assessment and alternative route analysis (EA) for CenterPoint Energy's proposed Bailey-Jones Creek project in Brazoria, Matagorda, and Wharton counties, Texas. The project will include an approximate 53 to 84 mile 345 kV double circuit transmission line intended to meet growing demand for energy in the Freeport, Texas area. POWER contributed to preparation of the Certificate of Convenience and Necessity (CCN) application for approval by the Texas Public Utility Commission (PUC),

which was submitted by CenterPoint on September 12, 2018. POWER supported the public involvement phase of the project which included three open house meetings, one in each county, with six manned GIS stations to collect public comments at each meeting. POWER also provided written direct testimony at the time of the CCN filing and will support the hearing phase of the project as required. Unique issues of this project include threatened and endangered species, consideration of U.S. Army Corps of Engineers designated Columbia Bottomlands and potential impacts to the overall project schedule, the San Bernard Wildlife Refuge and the Justin Hurst Wildlife Management Area, potential impacts to state-owned lands, expansion of State Highway 36, and close proximity to industrial facilities.

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**CenterPoint Energy, Brazos Valley Connection (Houston Import Project) Transmission Line Routing Study/EA and CCN Application, Texas**

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Project Manager for conducting a routing study and preparing the environmental assessment to support a CCN application for the ERCOT critical 345 kV Brazos Valley Connection Transmission Line project. The project study area is located in Grimes, Harris, and Waller counties, Texas. The project consists of constructing a new double-circuit 345 kV transmission line along an approximate 80 mile section between the existing Gibbons Creek Substation in Grimes County and the existing Zenith Substation in Harris County, Texas. Unique issues of this project include the compatibility of the proposed line with existing agricultural land use including an FAA VOR Facility, coal strip mines, oil and gas wells, expanding residential developments, and avoidance of potential habitat for federally listed bird and plant species. POWER supported four public meetings and provided manned-GIS Stations along with routing personnel and display boards and exhibits. This project was approved in April 2016.

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**American Electric Power, Gamesa Jackson Mountain Wind Farm 138 kV Transmission Line, Texas**

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Project Manager responsible for environmental services for a transmission line that would connect the Gamesa Jackson Mountain Wind Farm with AEP's proposed Nicole Substation near Abilene. POWER was contracted to provide environmental services to route this approximate 17-mile 138 kV transmission line, which would provide wind-generated power to AEP's delivery system. POWER conducted data collection and began preparing for a public meeting while also beginning preparation of the Environmental Assessment to accompany AEP's application for a Certificate of Convenience and Necessity to the Public Utility Commission of Texas. POWER was responsible for data acquisition and analysis, environmental assessment preparation, alternative route identification and comparison, public meeting coordination and participation, map preparation and abstractor coordination. This project was cancelled by the developer.

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**American Electric Power, Huntington Court - Roanoke 138 kV Transmission Line Siting, Virginia**

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Environmental Project Manager responsible for the team coordination, technical direction, client relations and document preparation. POWER routed the 138 kV transmission line through dense urban districts in the greater Roanoke area. The approximately eight-mile line is part of AEP's

Roanoke Area Improvement Projects. Key issues included impacts on residences and businesses, visual resources, and identified threatened and endangered species, including Virginia big-eared bat. POWER prepared a state-level EA as part of an application for a Certificate of Public Convenience and Necessity to Virginia's State Corporation Commission to route the project. POWER prepared written testimony in support of the routing and environmental assessment on this project.

#### **American Electric Power, Matt Funk 138 kV Transmission Lines, Virginia**

Environmental Project Manager responsible for team coordination and technical direction for siting two segments of a transmission line that is part of AEP's Roanoke Area Improvement Projects. POWER prepared a state-level environmental assessment to accompany AEP's application for a Certificate of Public Convenience and Necessity to the Virginia State Corporate Commission for the Matt Funk 138 kV Extension and Matt Funk 138 kV Bus Tie No. 1 projects. The two segments total about five miles in length. POWER prepared written testimony in support of the routing and environmental assessment.

#### **American Electric Power, Dolet Hills–Shreveport Routing Study, Louisiana**

Environmental Manager in charge of POWER's environmental support to AEP for Phase I of a proposed Dolet Hills–Shreveport Line in northwest Louisiana that involved three electrical system options. POWER's tasks included identification of one study area boundary encompassing the three options, data collection through digital imagery, constraints mapping, identification of preliminary and primary corridors for each option, field reconnaissance, data tabulation of key criteria, and a brief study report summarizing POWER's findings. Challenges to the study included area natural gas exploration facilities, the commercial/residential areas in and around Shreveport, floodplain agricultural lands, and the need for a USACE Section 10 permit to cross the Red River. The presence of the red-cockaded woodpecker and pallid sturgeon in and around the study area were also of concern. Using the National Wetlands Inventory Mapper, POWER's study considered locations of forested and emergent wetlands during the route development process.

#### **American Electric Power, Gravel Point to Yearwood 138 kV Transmission Line Project, Louisiana**

Project Manager responsible for oversight and coordination of all project components. POWER was contracted by AEP to perform an environmental assessment and alternative route analysis for the proposed Gravel Point to Yearwood 138 kV Transmission Line. The project is located in northwestern Louisiana and is required to meet increased demand due to the extensive oil/gas development of the Haynesville Shale and associated pipeline compressor stations. POWER also provided preliminary design and the cost/schedule estimate for design, material and construction of the project. Significant issues on the project included the Bayou Pierre Wildlife Management Area and the sprawling gas well development within the study area.

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**Oncor Electric Delivery, CREZ Willow Creek-Hicks 345 kV Line, Texas**


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Project Manager responsible for technical oversight, client relations, public outreach and project reporting for a new transmission line to bring wind-generated power from West Texas. POWER provided environmental services for a new transmission line that will allow Oncor to bring renewable energy into its service territory. The new 40-mile, 345 kV transmission line will bring power generated from wind farms in West Texas to Oncor's customers. The project is part of the Texas Competitive Renewable Energy Zone (CREZ) initiative. POWER acquired and analyzed resource data, coordinated and participated in the public outreach program, conducted the public input analysis, developed resource maps, identified and compared alternative routes, and prepared the Environmental Assessment which is part of the client's application for a Certificate of Convenience and Necessity to the Public Utility Commission of Texas. POWER also provided expert testimony support.

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**Oncor Electric Delivery, CREZ Clear Crossing-Willow Creek Line, Texas**


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Project Manager responsible for technical oversight, client relations, public outreach and project reporting for a new transmission line to link wind-generated power from West Texas to Oncor's service area. The new 345 kV transmission line will run approximately 100 miles across the north-central area of the state on lattice steel structures. The project was part of the Texas Competitive Renewable Energy Zones (CREZ) initiative to inject renewable energy into the Texas electrical grid. POWER collected and analyzed study area data, coordinated and participated in the public outreach program, conducted the public input analysis, developed resource maps, identified and compared alternative routes, and prepared the Environmental Assessment which was part of the client's application for a Certificate of Convenience and Necessity to the Public Utility Commission of Texas. POWER also provided expert testimony support.

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**Oncor Electric Delivery, CREZ Transmission Program, Texas**


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Environmental Project Manager responsible for assisting Oncor with the presentation and development of work scope tasks and subtasks for various CREZ projects. Tasks were used to create an overall project management schedule for the client's use in monitoring the collaborative CREZ project effort. POWER was an integral part of Oncor's CREZ team to site, design and construct approximately \$1.3 billion in transmission infrastructure projects as part of Texas' \$5 billion Competitive Renewable Energy Zones (CREZ) projects. The goal was to develop the transmission infrastructure needed to transport wind power from West Texas to the state's consumers. Planned Oncor projects include approximately 20 new or upgraded 345 kV substations and 100+ miles of 345 kV transmission lines.

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**Oncor Electric Delivery, Bell County East to TNP One 345 kV Transmission Line, Texas**


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Project Manager responsible for oversight and identification of preliminary alternative routes for the proposed Bell County East – TNP One 345 kV Transmission Line Project in central Texas. The transmission line is

approximately 40 miles long and includes a 160-foot right-of-way for the new double-circuit 345 kV transmission line in Bell, Milam, and Robertson counties, Texas. POWER was responsible for drafting a research design for the Texas Historical Commission prior to field studies being initiated. POWER produced an interim report and a draft archeological report, both of which were submitted to the Texas Historical Commission. POWER also participated in the technical conference, adequacy of routes hearing, and responded to Requests for Information (RFIs). POWER provided written direct testimony and delivered oral testimony in support of the PUCT CCN application at the hearing on merits at the State Office of Administrative Hearings (SOAH) offices in Austin.

#### **CenterPoint Energy Houston Electric, 138 kV Oyster Creek Line Routing Study/EA and CCN Application, Texas**

Environmental Project Manager responsible for preparing an environmental assessment and alternative route analysis report. POWER recently conducted the routing study and prepared the environmental assessment (EA) to support a Certificate of Convenience and Necessity (CCN) application for CenterPoint's 138 kV Oyster Creek Transmission Line project. The CCN application was filed in August 2013. The project study area is located in an industrial area, not far from the Gulf of Mexico, with sparse residential and commercial development in southern Brazoria County, Texas. Land use data collection was critical due to existing industrial facilities and their existing infrastructure, primarily major pipeline corridors and private transmission lines. POWER identified preliminary alternative route segments which were presented at a public meeting. POWER completed the public input analysis, conducted an alternative route comparison, and prepared the Routing Study/EA and many of the responses in the CCN application while considering the necessary requirements of Section 37.506(c)(4)(A)-(D) of the Texas Utilities Code, the Public Utility Commission of Texas (PUCT) CCN application form, and PUCT Substantive Rule 25.101. POWER provided direct testimony and this project was settled.

#### **CenterPoint Energy Houston Electric, 138 kV Springwoods Transmission Line EA, Routing Study and CCN Application, Texas**

Project Manager responsible for oversight and coordination of all project components. POWER conducted a routing study and prepared the environmental assessment to support a CCN application for the 138 kV Springwoods Transmission Line project. This project is located in a rapidly developing portion of northern Harris and southern Montgomery counties, Texas. Land use data collection and analysis was critical due to the number of existing, under construction, and proposed residential and associated commercial developments. POWER identified preliminary alternative route segments which were presented at a public meeting. POWER completed the public input analysis and conduct an alternative route comparison while considering the necessary requirements of Section 37.506(c)(4)(A)-(D) of the Texas Utilities Code, the Public Utility Commission of Texas (PUCT) CCN application form, and PUCT Substantive Rule 25.101. POWER also provided CCN Project Manager Services, a specific requirement for the project and includes the coordination of tasks for POWER and client personnel. No Hearing on the Merits was required and this project was approved through unanimous consent of the PUC Commissioners.

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**CenterPoint Energy Houston Electric, 138 kV Zenith Transmission Line EA, Routing Study and CCN Application, Texas**

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Project Manager responsible for oversight and coordination of all project components. POWER conducted a routing study and alternatives analysis and prepared the environmental assessment and CCN application for the 138 kV Zenith Transmission Line project. Land use data collection and analysis were critical due to residential and commercial developments in the area. POWER identified preliminary segments and presented preliminary alternatives at a public meeting, then recommended a preferred and three alternate routes based on public input analysis. Expert testimony support was not required because this project was not contested.

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**CenterPoint Energy Houston Electric, Freeport LNG 69 kV Transmission Line EA and Routing Study, Texas**

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Project Manager responsible for overseeing the transmission line routing studies and Environmental Assessment/CCN application preparation. This included data collection, field reconnaissance, and agency coordination. Responsible for developing the routing criteria and analyzing the routes by quantification of data into a spreadsheet. Routes analyzed included segment options proposed for directional drilling beneath the Gulf Intracoastal Waterway. Identified permitting requirements for underground segment options. Prepared the environmental assessment and coordinated agency compliance. Participated in the PUCT project Technical Conference and prepared written and delivered oral testimony in support of the CCN application. Expert written and oral testimony was provided.

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**CenterPoint Energy Houston Electric, Freeport LNG 69 kV Transmission Line Permitting, Texas**

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Project Manager responsible for the coordination of environmental permit and clearance requirements for the Freeport LNG 69 kV transmission line. Assisted in transfer of Freeport LNG's U.S. Army Corps of Engineers Permit related to the transmission line to CenterPoint. Prepared the project Stormwater Pollution Prevention Plan, assisted in compliance with recommendations made by the U.S. Fish and Wildlife Service, Texas Parks & Wildlife and the State Historic Preservation Officer. Upon approval of the CCN application by the PUCT, POWER assisted with obtaining the necessary environmental permits/clearances for construction of the project. Responsible for selecting and coordinating with an archaeological firm to conduct background research and prepare a letter of recommendation to the Texas Historical Commission (THC). Concurrence from THC was granted and no survey was required. Prepared an abbreviated Environmental Site Assessment and conducted soil sampling to determine the disposal procedure of excavated materials resulting during construction.

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**Texas-New Mexico, Westminster 138 kV Line Study, Texas**

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Environmental Manager for a routing study for a new 138 kV transmission line. TNMP proposed to build a 138 kV/22 kV substation in Westminster, Texas near the intersection of SH-121 and FM2862. To energize this substation a transmission line was needed to connect the Westminster substation to an existing 138 kV line. The process encompassed development

of an EA in support of TNMP's CCN application with several alternative routes for the Commission to choose from for approval. The study area includes a 90-acre hunting lodge with an approximate 2,500 foot air strip. POWER was tasked with conducting an alternative route analysis and preparation of an EA. POWER also assisted TNMP with the notice for the public meetings and the CCN Filing. POWER provided expert testimony support.

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**Texas-New Mexico Power, Princeton Loop 138 kV Transmission Line Study, Texas**

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For its new 138 kV transmission loop near Princeton, Texas, TNMP retained POWER to perform an alternatives analysis and develop an EA document to file with the CCN application, including numerous alternative routes for consideration by the Public Utility Commission (PUC). The proposed transmission loop will link two of TNMP's existing stations and an existing 69kV transmission line rebuilt to 138kV. The loop runs in and out of four of TNMP substations: Longneck, Climax, Princeton South and Farmersville West. POWER assisted with easement language research and has helped to coordinate and participate in meetings with the USACE and TxDOT regarding consideration of crossing Lake Lavon. POWER will assist TNMP with the notice for the public meeting and the CCN Filing. POWER will provide expert testimony support if necessary. This project is currently on hold.

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**Xcel Energy Services, Kiser to Kress 115 kV Transmission Line Project, Texas**

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Project Coordinator responsible for day-to-day activities, managing project deliverables and resources. POWER performed an environmental assessment and alternative route analysis for submittal with the Certificate of Convenience and Necessity application for the Kiser to Kress Transmission Line Project. The project is located in west Texas and is required to meet the Southwest Power Pool network upgrade. The project consists of approximately 16 miles of 115 kV transmission line. Environmental issues included siting through irrigated agricultural land and rural residential development. POWER provided expert testimony support.

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**Xcel Energy Services, Kiser to Cox 115 kV Transmission Line Project, Texas**

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Project Coordinator responsible for day-to-day activities, managing project deliverables and resources. POWER performed an environmental assessment and alternative route analysis for submittal with the Certificate of Convenience and Necessity application for the Kiser to Cox Transmission Line Project. The project is located in west Texas and is required to meet the Southwest Power Pool network upgrade. The project consists of approximately eight miles of 115 kV transmission line. Environmental issues included siting through irrigated agricultural land and rural residential development. POWER provided expert testimony support.

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**Deep East Texas Electric Cooperative, Inc., Fairmount 138 kV Transmission Line, Texas**

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Environmental Project Manager responsible for technical oversight, client relations, public outreach, project reporting and preparation of the Environmental Assessment. The project consists of a new substation and 138 kV transmission line. POWER's environmental services included supporting preparation of the Certificate of Convenience and Necessity (CCN) document for filing with the Public Utility Commission of Texas. Tasks included data acquisition and analysis, preliminary alternatives identification, providing exhibits and support staff for a public meeting, public input analysis, and preparation of the EA including recommendation of a preferred route. The study area includes forested land, agricultural land, and gently rolling hills with residential/commercial properties. Significant land use features within or near the study area include the US Forest Service and Toledo Bend Reservoir. This project was administratively approved by the PUC.

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**Mines Management, Montanore Mine Transmission Line MFSA, Montana**

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Project Coordinator responsible for directing the environmental analysis and overseeing the preparation of a Montana Major Facilities Siting Act application for a transmission line to a new mine in northwestern Montana. Coordinated POWER team members and 10 subcontractors to complete the application. The 16-mile, 230 kV transmission line would supply power to an underground silver and copper mine located below a Wilderness Area on the Kootenai National Forest. The analysis included biological, cultural, hydrological, and social economic studies in a four-volume document.

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**Riverside Public Utilities, Riverside Transmission Reliability Project Environmental Impact Report (EIR), California**

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Public Outreach Coordinator for agency and tribal contacts for the project definition phase for an Environmental Impact Report. Responsible for developing a contact list, preparing contact letters, follow-up telephone calls, scheduling meetings, and documenting agency and tribal comments. POWER provided environmental and permitting services for a major upgrade to the City of Riverside's electric delivery system. POWER conducted a siting study to identify alternative routes for 230 kV and 69 kV transmission lines and prepared an EIR under the California Environmental Quality Act. Scope included extensive public and agency outreach, biological surveys, cultural surveys, Native American coordination/meetings, urban line siting, and the CEQA Initial Study.

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**Nebraska Public Power District, Electric Transmission Reliability Project Routing Study, Nebraska**

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Environmental Specialist responsible for assisting the permitting effort for a study to select the preferred route of a proposed new 345 kV transmission line in east-central Nebraska. Permitting included Army Corps of Engineers Section 404; jurisdictional wetlands; storm water; Section 401 Water Quality Certification; FAA notices; Nebraska Power Review Board and Nebraska Public Service Commission applications; highway, railroad, and foreign utility crossings; and flood control. POWER collected data on the study area and evaluated route corridors. The fast-track project determined the project

study area and selected the preferred route for the approximately 80-mile-long transmission line from Columbus to Lincoln. The report assessed the project's impacts on land uses, visual resources, cultural resources, and biological resources and identified engineering constraints.

#### **Entergy, Golden Meadow - Leeville 115 kV Transmission Line, Louisiana**

Environmental Project Manager Environmental Project Manager for a project where POWER has been contracted by Entergy to perform an environmental assessment and alternative route analysis for the rebuild of the 13.4-mile Golden Meadow to Leeville 115 kV transmission line project in a new right of way. The existing in-service transmission line exceeded its design lifespan and served an offshore oil unloading facility that is vital to the national energy interest. The project area is located in coastal Louisiana and considerations during the routing study include coastal wetland impacts, accessibility for maintenance activities, cost and design and other land use issues. POWER was responsible for environmental and land use data collection, constraints mapping, developing alternative routes, tabulating potential environmental and land use impacts, and recommending a preferred route. The routing study and EA will be used to defend the selected route and to support permitting requirements. POWER also provided preliminary design and the cost/schedule estimate for design, material and construction of the project. The project involved a new 115 kV transmission line designed to 230 kV standards, and required design and implementation of custom base plated steel poles, custom-vibrated steel caissons in the estuaries of Louisiana. POWER was responsible for all phases of line engineering including survey coordination, structure spotting and structure drawings, structure analysis, material ordering, and construction support. This transmission line is responsible for providing electricity to produce a large share of the U.S.'s oil. Design includes critical routing through pristine saltwater estuaries, structure spotting, load tree calculations, foundation design in very poor soils, material identification and orders, and coordination with client, surveyor, and client's construction division.

#### **Oklahoma Gas & Electric, Simmons-Mountainburg 161 kV Transmission Line EA and Routing Study, Arkansas**

Principal Investigator responsible for data collection, field reconnaissance, and agency coordination for a new 161 kV transmission line in the Ozark Mountain ecoregion in Crawford County, Arkansas. The project was filed with the Arkansas Public Service Commission as a major utility facility and required a Certificate of Environmental Compatibility and Public Need (CECPN). The environmental assessment included discussions on natural resources in the study area, potential impacts of the proposed alternatives and also provided mitigation measures. Collaborated in development of the routing criteria, route analysis, and prepared the environmental assessment.

#### **Oklahoma Gas & Electric, Razorback-Short Mountain 161 kV Line EA and Routing Study, Arkansas**

Principal Investigator responsible for data collection, field reconnaissance, and agency coordination for a new 161 kV transmission line in the Arkansas Valley ecoregion in Logan County, Arkansas. The project was filed with the Arkansas Public Service Commission as a major utility facility and required

a Certificate of Environmental Compatibility and Public Need (CECPN). The environmental assessment included discussions on natural resources in the study area, potential impacts of the proposed alternatives and also provided mitigation measures. Collaborated in the development of the routing criteria and analyzing the routes by quantification of data into a spreadsheet. Prepared the environmental assessment and identified agency involvement.

#### **TXU Electric Delivery, Copperas Cove 138 kV Transmission Line EA and Routing Study, Texas**

Principal Investigator responsible for data collection, field reconnaissance, and preliminary agency coordination. Responsible for developing the routing criteria and analysis of segments and routes for this unique project which included an Army airborne training facility (Fort Hood) within the study area along with land managed by Texas Park & Wildlife and a Texas Youth Commission Facility. Participated in coordination meetings with these entities and also with the organization and preparation of public meetings. Assisted with the analysis of the alternative routes using a spreadsheet and preparation of the EA and routing study report submitted to the Public Utility Commission of Texas (PUCT).

#### **American Electric Power, Coletto Creek-Pawnee 345 kV Transmission Line EA and Routing Study, Texas**

Project Manager responsible for project administration and coordination of this 52.3-mile project including data collection, field reconnaissance, and public meetings. Led the analysis of the alternative routes using a spreadsheet and preparation of the EA and routing study report submitted to the Public Utility Commission of Texas (PUCT). The project was on an expedited schedule to meet PUCT requirements. Assisted in coordination between AEP and South Texas Electric Cooperative (STEC) to develop both portions of the recommended ERCOT/ISO project (Coletto Creek to San Miguel) to enhance the PUCT review process. Prepared written and delivered oral, testimony to the PUCT in support of the CCN application.

Also responsible for seeking guidance and clarification from U.S. Fish and Wildlife Service on clearing issues during the migratory bird season. Guidance resulted in performing field investigations and avian nest surveys along the proposed right of way. The surveys allowed construction of the 345kV transmission line in south Texas to continue as required.

#### **American Electric Power, Permitting for the Coletto Creek-Pawnee 345kV Line, Texas**

Sought guidance from the U.S. Fish and Wildlife Service concerning potential impacts to nesting eagles along the San Antonio River in Texas. Designed and participated in an aerial survey for eagle nests where the new 345 kV transmission line was proposed to cross the River. Results of the aerial survey permitted clearing and construction activities to continue as necessary.

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**Reliant Energy, SIENNA Project, Texas**


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Assisted with the SIENNA project which required construction of a new two-transformer 138/35 kV substation with four 35kV distribution circuits to handle the load growth. Assisted in preparation of the Environmental Assessment and routing study for construction of a new transmission line to service the SIENNA substation. Participated in the selection and development of the evaluation criteria for environmental impacts, socioeconomic impacts, and cost considerations. Developed a matrix and identified routing criterion. Assisted in producing Reliant Energy HL&P's application for a Certificate of Convenience and Necessity (CCN) for submission to the PUCT.

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**Reliant Energy, Galveston Island 138 kV Line, Texas**


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Coordinated the notification process for a new 138 kV transmission line to Galveston Island, Texas. Gathered information from county appraisal maps, aerial photographs, property abstracts and field reconnaissance studies. Developed a mailing list identifying property owners along the preferred and alternate routes. Over 1,400 notification letters were prepared for mailing.

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**CLECO Midstream Resources, Phase I Environmental Site Assessments, Alabama, Tennessee, Georgia**


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Prepared Phase I Environmental Site Assessments for the construction of new power plants in Alabama, Tennessee, and Georgia. The purpose of the Phase I ESAs was to identify Recognized Environmental Conditions associated with the current and historical usage of the Properties and adjoining properties, nearby off-site sources of potential impact, and the potential environmental impact on the Property from surrounding conditions or activities. Each assessment involved on-site visits for data collection, photo-documentation, visual observations of adjoining properties and in-person interviews. In addition, as required, regulatory background reviews were conducted including interpretation of historical aerial photographs and U.S. Geologic Service Maps.

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**Lower Colorado River Authority, Hockley-Macedonia Transmission Line, Texas**


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Assisted on the preparation and submission of a natural resource assessment for the Hockley to Macedonia Transmission Line in Waller County, Texas.

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**Pedernales Electric Cooperative, Hays County Substation, Texas**


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Responsible for overseeing completion of a Natural Resource Assessment (NRA), Storm Water Pollution Prevention Plan (SWPPP) and a Spill Prevention Control and Countermeasure (SPCC) Plan for a proposed substation in Hays County, Texas.

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**Texas-New Mexico Power, Galveston County Substation, Texas**


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Responsible for overseeing completion of a Natural Resource Assessment (NRA), Storm Water Pollution Prevention Plan (SWPPP) and a Spill Prevention Control and Countermeasure (SPCC) Plan for a proposed substation in Galveston County, Texas.

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**Brownsville Public Utilities Board, SPCC Plan, Texas**


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Assisted the client with Spill Prevention Control and Countermeasure (SPCC) Plan determinations needs and preparation of over 15 substations and four other facilities. Responsible for data collection and developed a SPCC Plan template for incorporation of Brownsville's 15 substations into one plan. The multi-facility and the single facility Plans follow the Environmental Protection Agency (EPA) revisions to the Oil Pollution regulation, otherwise known as the SPCC regulation in 40 CFR Part 112.

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**Broadwing Communications, Houston-San Antonio Fiber Optic Line, Texas**


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Project Manager for a fiber optic build between Houston and San Antonio. Responsible for coordination of all permitting activities and agency consultations to meet Broadwing's construction schedule. Coordinated meeting the archeological requirements with the Texas Department of Transportation and the Texas Historical Commission.

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**Sprint, Fiber Optic Interconnects, Texas**


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Project Manager for two fiber optic interconnects. One interconnect extended from Richardson to Plano, Texas and the other was in the City of Austin, Texas. Responsible for overseeing the due diligence studies to determine the environmental compliance requirements. Responsible for obtaining the required permits and coordination with the City of Austin to complete the City's General Permit accompanied by a tree survey.

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**Miller Environmental, Inc., Cell Tower Study, Texas**


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Designed and performed a red balloon tests to determine the area of potential effect (APE) based on the height of proposed cell towers. All known historic properties and State Archeological Landmarks (SALs) were identified within the appropriate distance and plotted on a USGS map. In the field, a red 100-gram meteorological balloon was tethered to the ground to represent the height and location of the proposed cell tower site. Photographs were taken from each known historic property and SALs looking back at the red balloon. This process assessed the impacts the proposed tower would have on the visual character or setting of historic properties or SALs. The project received approval for construction and erection of the cell tower to proceed.

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**Williams Communications, Inc., El Paso-Houston Fiber Optic Line, Texas**


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Assisted in the permitting process of a fiber optics cable spanning from El Paso to Houston. Responsible for submitting a Nationwide 12-permit application with the Corp of Engineers and easement permits with the Texas General Land Office.

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**Enogex, Natural Gas Pipeline, Oklahoma**


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Assisted with obtaining environmental permits for a 26-mile long natural gas pipeline in Tulsa, Wagoner, and Creek counties. Visited and coordinated with various agency representatives in Oklahoma to present the project and determine initial agency concerns. Assisted in the organization and

coordination of the archeological survey and was also responsible for developing and submitting weekly client updates for all aspects of the project.

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**Contract Technology, Inc., Phase I Environmental Site Assessment, Texas**

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Prepared a Phase I Environmental Site Assessment for sale of property to a bank to satisfy a requirement to qualify for the innocent landowner defense.

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**Confidential Client, Phase I Environmental Site Assessment, Texas**

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Prepared a Phase I Environmental Site Assessment for a confidential client along the Houston Ship Channel.

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**Phoenix Resources, Inc., 3-D Seismic Program, Texas**

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Prepared the Operations Plan and Environmental Assessment for a proposed 3-D Seismic Program on approximately 3,500 acres on the Myrtle Foester Whitmire Division of the Aransas National Wildlife Refuge in Calhoun County, Texas. The Operations Plan and Environmental Assessment (EA) was used by the Refuge Manager to support a Finding of No Significant Impact (FONSI) to support the issuance of a Special Use Permit (SUP) for the project. The scope of work on this project included a pre-project meeting with Phoenix Resources, Inc. and Refuge staff, data acquisition, preparation of the draft and final plans, a cultural and archeological resource search and coordination with various federal, state and local agencies during the course of the project. The EA was consistent with the requirements of the National Environmental Policy Act (NEPA), which supports the federal action of issuance of a SUP. The project was accomplished in a manner that did not compromise the Refuge or seismic survey activities.

(V.A.C.S. art. 1446c-0, sec. 2.258.) (Amended by Acts 2009, 81st Leg., R.S., ch. 1170 (HB 3309), § 4 (amended subsecs. (a), (b), and (c)).)

**Sec. 37.056. GRANT OR DENIAL OF CERTIFICATE.**

(a) The commission may approve an application and grant a certificate only if the commission finds that the certificate is necessary for the service, accommodation, convenience, or safety of the public.

(b) The commission may:

- (1) grant the certificate as requested;
- (2) grant the certificate for the construction of a portion of the requested system, facility, or extension or the partial exercise of the requested right or privilege; or
- (3) refuse to grant the certificate.

(c) The commission shall grant each certificate on a nondiscriminatory basis after considering:

- (1) the adequacy of existing service;
- (2) the need for additional service;
- (3) the effect of granting the certificate on the recipient of the certificate and any electric utility serving the proximate area; and
- (4) other factors, such as:
  - (A) community values;
  - (B) recreational and park areas;
  - (C) historical and aesthetic values;
  - (D) environmental integrity;
  - (E) the probable improvement of service or lowering of cost to consumers in the area if the certificate is granted; and
  - (F) to the extent applicable, the effect of granting the certificate on the ability of this state to meet the goal established by Section 39.904(a) of this title.

(d) The commission by rule shall establish criteria, in addition to the criteria described by Subsection (c), for granting a certificate for a transmission project that serves the ERCOT power region, that is not necessary to meet state or federal reliability standards, and that does not serve a competitive renewable energy zone. The criteria must include a comparison of the estimated cost of the transmission project and the estimated cost savings that may result from the transmission project. The commission shall include with its decision on an application for a certificate to which this subsection applies findings on the criteria.

(V.A.C.S. art. 1446c-0, secs. 2.255(b), (c).) (Amended by Acts 2003, 78th Leg., R.S., ch. 295 (HB 2548), § 2 (added subd. (c)(4)(F)); Acts 2011, 82nd Leg., R.S., ch. 949 (HB 971), § 2(a) (added subsec. (d)).)

**Sec. 37.057. DEADLINE FOR APPLICATION FOR NEW TRANSMISSION FACILITY.**

The commission may grant a certificate for a new transmission facility to a qualified applicant that meets the requirements of this subchapter. The commission must approve or deny an application for a certificate for a new transmission facility not later than the first anniversary of the date the application is filed. If the commission does not approve or deny the application on or before that date, a party may seek a writ of mandamus in a district court of Travis County to compel the commission to decide on the application.

(V.A.C.S. art. 1446c-0, sec. 2.255(e).) (Amended by Acts 2009, 81st Leg., R.S., ch. 1170 (HB 3309), § 4).

**Sec. 37.058. CERTIFICATE AND DETERMINATION ISSUED TO CERTAIN NON-ERCOT UTILITIES FOR GENERATING FACILITY.**

(a) This section applies only to an electric utility that operates solely outside of ERCOT.

## CHAPTER 25. SUBSTANTIVE RULES APPLICABLE TO ELECTRIC SERVICE PROVIDERS.

### Subchapter E. CERTIFICATION, LICENSING AND REGISTRATION.

#### §25.101. Certification Criteria.

- (a) **Definitions.** The following words and terms, when used in this section, shall have the following meanings unless the context clearly indicates otherwise:
- (1) **Construction and/or extension** -- Shall not include the purchase or condemnation of real property for use as facility sites or right-of-way. Acquisition of right-of-way shall not be deemed to entitle an electric utility to the grant of a certificate of convenience and necessity without showing that the construction and/or extension is necessary for the service, accommodation, convenience, or safety of the public.
  - (2) **Generating unit** -- Any electric generating facility. This section does not apply to any generating unit that is less than ten megawatts and is built for experimental purposes only.
  - (3) **Habitable structures** -- Structures normally inhabited by humans or intended to be inhabited by humans on a daily or regular basis. Habitable structures include, but are not limited to: single-family and multi-family dwellings and related structures, mobile homes, apartment buildings, commercial structures, industrial structures, business structures, churches, hospitals, nursing homes, and schools.
  - (4) **Municipal Power Agency (MPA)** -- Agency or group created under Texas Utilities Code, Chapter 163 -- Joint Powers Agencies.
  - (5) **Municipal Public Entity (MPE)** -- A municipally owned utility (MOU) or a municipal power agency.
  - (6) **Prudent avoidance** -- The limiting of exposures to electric and magnetic fields that can be avoided with reasonable investments of money and effort.
  - (7) **Tie line** -- A facility to be interconnected to the Electric Reliability Council of Texas (ERCOT) transmission grid by a person, including an electric utility or MPE, that would enable additional power to be imported into or exported out of the ERCOT power grid.
- (b) **Certificates of convenience and necessity for new service areas and facilities.** Except for certificates granted under subsection (e) of this section, the commission may grant an application and issue a certificate only if it finds that the certificate is necessary for the service, accommodation, convenience, or safety of the public, and complies with the statutory requirements in the Public Utility Regulatory Act (PURA) §37.056. The commission may issue a certificate as applied for, or refuse to issue it, or issue it for the construction of a portion of the contemplated system or facility or extension thereof, or for the partial exercise only of the right or privilege. The commission shall render a decision approving or denying an application for a certificate within one year of the date of filing of a complete application for such a certificate, unless good cause is shown for exceeding that period. A certificate, or certificate amendment, is required for the following:
- (1) **Change in service area.** Any certificate granted under this section shall not be construed to vest exclusive service or property rights in and to the area certificated.
    - (A) **Uncontested applications:** An application for a certificate under this paragraph shall be approved administratively within 80 days from the date of filing a complete application if:
      - (i) no motion to intervene has been filed or the application is uncontested;
      - (ii) all owners of land that is affected by the change in service area and all customers in the service area being changed have been given direct mail notice of the application; and
      - (iii) commission staff has determined that the application is complete and meets all applicable statutory criteria and filing requirements, including, but not limited to, the provision of proper notice of the application.
    - (B) **Minor boundary changes or service area exceptions:** Applications for minor boundary changes or service area exceptions shall be approved administratively within 45 days of the filing of the application provided that:

## CHAPTER 25. SUBSTANTIVE RULES APPLICABLE TO ELECTRIC SERVICE PROVIDERS.

### Subchapter E. CERTIFICATION, LICENSING AND REGISTRATION.

- (i) every utility whose certificated service area is affected agrees to the change;
  - (ii) all customers within the affected area have given prior consent; and
  - (iii) commission staff has determined that the application is complete and meets all applicable statutory criteria and filing requirements, including, but not limited to, the provision of proper notice of the application.
- (2) **Generation facility.**
  - (A) In a proceeding involving the purchase of an existing electric generating facility by an electric utility that operates solely outside of ERCOT, the commission shall issue a final order on a certificate for the facility not later than the 181<sup>st</sup> day after the date a request for the certificate is filed with the commission under PURA §37.058(b).
  - (B) In a proceeding involving a newly constructed generating facility by an electric utility that operates solely outside of ERCOT, the commission shall issue a final order on a certificate for the facility not later than the 366<sup>th</sup> day after the date a request for the certificate is filed with the commission under PURA §37.058(b).
- (3) **Electric transmission line.** All new electric transmission lines shall be reported to the commission in accordance with §25.83 of this title (relating to Transmission Construction Reports). This reporting requirement is also applicable to new electric transmission lines to be constructed by an MPE seeking to directly or indirectly construct, install, or extend a transmission facility outside of its applicable boundaries. For an MOU, the applicable boundaries are the municipal boundaries of the municipality that owns the MOU. For an MPA, the applicable boundaries are the municipal boundaries of the public entities participating in the MPA.
  - (A) Need:
    - (i) Except as stated below, the following must be met for a transmission line in the ERCOT power region. The applicant must present an economic cost-benefit study that includes an analysis that shows that the levelized ERCOT-wide annual production cost savings attributable to the proposed project are equal to or greater than the first-year annual revenue requirement of the proposed project of which the transmission line is a part. Indirect costs and benefits to the transmission system may be included in the cost-benefit study. The commission shall give great weight to such a study if it is conducted by the ERCOT independent system operator. This requirement also does not apply to an application for a transmission line that is necessary to meet state or federal reliability standards, including: a transmission line needed to interconnect a transmission service customer or end-use customer; or needed due to the requirements of any federal, state, county, or municipal government body or agency for purposes including, but not limited to, highway transportation, airport construction, public safety, or air or water quality.
    - (ii) For a transmission line not addressed by clause (i) of this subparagraph, the commission shall consider among other factors, the needs of the interconnected transmission systems to support a reliable and adequate network and to facilitate robust wholesale competition. The commission shall give great weight to:
      - (I) the recommendation of an organization that meets the requirement of PURA §39.151; and/or
      - (II) written documentation that the transmission line is needed to interconnect a transmission service customer or an end-use customer.

## CHAPTER 25. SUBSTANTIVE RULES APPLICABLE TO ELECTRIC SERVICE PROVIDERS.

### Subchapter E. CERTIFICATION, LICENSING AND REGISTRATION.

- (B) **Routing:** An application for a new transmission line shall address the criteria in PURA §37.056(c) and considering those criteria, engineering constraints, and costs, the line shall be routed to the extent reasonable to moderate the impact on the affected community and landowners unless grid reliability and security dictate otherwise. The following factors shall be considered in the selection of the utility's alternative routes unless a route is agreed to by the utility, the landowners whose property is crossed by the proposed line, and owners of land that contains a habitable structure within 300 feet of the centerline of a transmission project of 230 kV or less, or within 500 feet of the centerline of a transmission project greater than 230 kV, and otherwise conforms to the criteria in PURA §37.056(c):
  - (i) whether the routes parallel or utilize existing compatible rights-of-way for electric facilities, including the use of vacant positions on existing multiple-circuit transmission lines;
  - (ii) whether the routes parallel or utilize other existing compatible rights-of-way, including roads, highways, railroads, or telephone utility rights-of-way;
  - (iii) whether the routes parallel property lines or other natural or cultural features; and
  - (iv) whether the routes conform with the policy of prudent avoidance.
- (C) **Uncontested transmission lines:** An application for a certificate for a transmission line shall be approved administratively within 80 days from the date of filing a complete application if:
  - (i) no motion to intervene has been filed or the application is uncontested; and
  - (ii) commission staff has determined that the application is complete and meets all applicable statutory criteria and filing requirements, including, but not limited to, the provision of proper notice of the application.
- (D) **Projects deemed critical to reliability.** Applications for transmission lines which have been formally designated by a PURA §39.151 organization as critical to the reliability of the system shall be considered by the commission on an expedited basis. The commission shall render a decision approving or denying an application for a certificate under this subparagraph within 180 days of the date of filing a complete application for such a certificate unless good cause is shown for extending that period.
- (4) **Tie line.** An application for a tie line must include a study of the tie line by the ERCOT independent system operator. The study shall include, at a minimum, an ERCOT-approved reliability assessment of the proposed tie line. If an independent system operator intends to conduct a study to evaluate a proposed tie line or intends to provide confidential information to another entity to permit the study of a proposed tie line, the independent system operator shall file notice with the commission at least 45 days prior to the commencement of such a study or the provision of such information. This paragraph does not apply to a facility that is in service on December 31, 2014.
- (c) **Projects or activities not requiring a certificate.** A certificate, or certificate amendment, is not required for the following:
  - (1) A contiguous extension of those facilities described in PURA §37.052;
  - (2) A new electric high voltage switching station, or substation;
  - (3) The repair or reconstruction of a transmission facility due to emergencies. The repair or reconstruction of a transmission facility due to emergencies shall proceed without delay or prior approval of the commission and shall be reported to the commission in accordance with §25.83 of this title;
  - (4) The construction or upgrading of distribution facilities within the electric utility's service area;

## CHAPTER 25. SUBSTANTIVE RULES APPLICABLE TO ELECTRIC SERVICE PROVIDERS.

### Subchapter E. CERTIFICATION, LICENSING AND REGISTRATION.

- (5) Routine activities associated with transmission facilities that are conducted by transmission service providers. Nothing contained in the following subparagraphs should be construed as a limitation of the commission's authority as set forth in PURA. Any activity described in the following subparagraphs shall be reported to the commission in accordance with §25.83 of this title. The commission may require additional facts or call a public hearing thereon to determine whether a certificate of convenience and necessity is required. Routine activities are defined as follows:
  - (A) The modification or extension of an existing transmission line solely to provide service to a substation or metering point provided that:
    - (i) an extension to a substation or metering point does not exceed one mile; and
    - (ii) all landowners whose property is crossed by the transmission facilities have given prior written consent.
  - (B) The rebuilding, replacement, or respacing of structures along an existing route of the transmission line; upgrading to a higher voltage not greater than 230 kV; bundling of conductors or reconductoring of an existing transmission facility, provided that:
    - (i) no additional right-of-way is required; or
    - (ii) if additional right-of-way is required, all landowners of property crossed by the electric facilities have given prior written consent.
  - (C) The installation, on an existing transmission line, of an additional circuit not previously certificated, provided that:
    - (i) the additional circuit is not greater than 230 kV; and
    - (ii) all landowners whose property is crossed by the transmission facilities have given prior written consent.
  - (D) The relocation of all or part of an existing transmission facility due to a request for relocation, provided that:
    - (i) the relocation is to be done at the expense of the requesting party; and
    - (ii) the relocation is solely on a right-of-way provided by the requesting party.
  - (E) The relocation or alteration of all or part of an existing transmission facility to avoid or eliminate existing or impending encroachments, provided that all landowners of property crossed by the electric facilities have given prior written consent.
  - (F) The relocation, alteration, or reconstruction of a transmission facility due to the requirements of any federal, state, county, or municipal governmental body or agency for purposes including, but not limited to, highway transportation, airport construction, public safety, or air and water quality, provided that:
    - (i) all landowners of property crossed by the electric facilities have given prior written consent; and
    - (ii) the relocation, alteration, or reconstruction is responsive to the governmental request.
- (6) Upgrades to an existing transmission line by an MPE that do not require any additional land, right-of-way, easement, or other property not owned by the MOU;
- (7) The construction, installation, or extension of a transmission facility by an MPE that is entirely located not more than 10 miles outside of an MOU's certificated service area that occurs before September 1, 2021; or
- (8) A transmission facility by an MOU placed in service after September 1, 2015, that is developed to interconnect a new natural gas generation facility to the ERCOT transmission grid and for which, on or before January 1, 2015, an MOU was contractually obligated to purchase at least 190 megawatts of capacity.

## CHAPTER 25. SUBSTANTIVE RULES APPLICABLE TO ELECTRIC SERVICE PROVIDERS.

### Subchapter E. CERTIFICATION, LICENSING AND REGISTRATION.

- (d) **Standards of construction and operation.** In determining standard practice, the commission shall be guided by the provisions of the American National Standards Institute, Incorporated, the National Electrical Safety Code, and such other codes and standards that are generally accepted by the industry, except as modified by this commission or by municipal regulations within their jurisdiction. Each electric utility shall construct, install, operate, and maintain its plant, structures, equipment, and lines in accordance with these standards, and in such manner to best accommodate the public, and to prevent interference with service furnished by other public utilities insofar as practical.
- (1) The standards of construction shall apply to, but are not limited to, the construction of any new electric transmission facilities, rebuilding, upgrading, or relocation of existing electric transmission facilities.
  - (2) For electric transmission line construction requiring the acquisition of new rights-of-way, electric utilities must include in the easement agreement, at a minimum, a provision prohibiting the new construction of any above-ground structures within the right-of-way. New construction of structures shall not include necessary repairs to existing structures, farm or livestock facilities, storage barns, hunting structures, small personal storage sheds, or similar structures. Utilities may negotiate appropriate exceptions in instances where the electric utility is subject to a restrictive agreement being granted by a governmental agency or within the constraints of an industrial site. Any exception to this paragraph must meet all applicable requirements of the National Electrical Safety Code.
  - (3) Measures shall be applied when appropriate to mitigate the adverse impacts of the construction of any new electric transmission facilities, and the rebuilding, upgrading, or relocation of existing electric transmission facilities. Mitigation measures shall be adapted to the specifics of each project and may include such requirements as:
    - (A) selective clearing of the right-of-way to minimize the amount of flora and fauna disturbed;
    - (B) implementation of erosion control measures;
    - (C) reclamation of construction sites with native species of grasses, forbs, and shrubs; and
    - (D) returning site to its original contours and grades.
- (e) **Certificates of convenience and necessity for existing service areas and facilities.** For purposes of granting these certificates for those facilities and areas in which an electric utility was providing service on September 1, 1975, or was actively engaged in the construction, installation, extension, improvement of, or addition to any facility actually used or to be used in providing electric utility service on September 1, 1975, unless found by the commission to be otherwise, the following provisions shall prevail for certification purposes:
- (1) The electrical generation facilities and service area boundary of an electric utility having such facilities in place or being actively engaged in the construction, installation, extension, improvement of, or addition to such facilities or the electric utility's system as of September 1, 1975, shall be limited, unless otherwise provided, to the facilities and real property on which the facilities were actually located, used, or dedicated as of September 1, 1975.
  - (2) The transmission facilities and service area boundary of an electric utility having such facilities in place or being actively engaged in the construction, installation, extension, improvement of, or addition to such facilities or the electric utility's system as of September 1, 1975, shall be, unless otherwise provided, the facilities and a corridor extending 100 feet on either side of said transmission facilities in place, used or dedicated as of September 1, 1975.
  - (3) The facilities and service area boundary for the following types of electric utilities providing distribution or collection service to any area, or actively engaged in the construction, installation, extension, improvement of, or addition to such facilities or the electric utility's system as of September 1, 1975, shall be limited, unless otherwise found by the commission, to the facilities and the area which lie within 200 feet of any point along a distribution line, which is specifically deemed to include service drop lines, for electrical utilities.

**CHAPTER 25. SUBSTANTIVE RULES APPLICABLE TO ELECTRIC SERVICE PROVIDERS.****Subchapter E. CERTIFICATION, LICENSING AND REGISTRATION.**

- (f) **Transferability of certificates.** Any certificate granted under this section is not transferable without approval of the commission and shall continue in force until further order of the commission.
- (g) **Certification forms.** All applications for certificates of convenience and necessity shall be filed on commission-prescribed forms so that the granting of certificates, both contested and uncontested, may be expedited. Forms may be obtained from Central Records.
- (h) **Commission authority.** Nothing in this section is intended to limit the commission's authority to recommend or direct the construction of transmission under PURA §§35.005, 36.008, or 39.203(e).

**PUC DOCKET NO. 48787**

<b>JOINT APPLICATION OF LCRA</b>	<b>§</b>	<b>BEFORE THE</b>
<b>TRANSMISSION SERVICES</b>	<b>§</b>	
<b>CORPORATION AND AEP TEXAS INC.</b>	<b>§</b>	
<b>TO AMEND THEIR CERTIFICATES OF</b>	<b>§</b>	<b>PUBLIC UTILITY COMMISSION</b>
<b>CONVENIENCE AND NECESSITY FOR</b>	<b>§</b>	
<b>THE PROPOSED BAKERSFIELD TO</b>	<b>§</b>	
<b>SOLSTICE 345-KV TRANSMISSION</b>	<b>§</b>	<b>OF TEXAS</b>
<b>LINE PROJECT IN PECOS COUNTY,</b>	<b>§</b>	
<b>TEXAS</b>		

**DIRECT TESTIMONY AND EXHIBIT**

**OF**

**CURTIS D. SYMANK, P.E. #65776**

**ON BEHALF OF**

**APPLICANTS**  
**LCRA TRANSMISSION SERVICES CORPORATION**  
**AND**  
**AEP TEXAS INC.**

**NOVEMBER 2018**

**PUC DOCKET NO. 48787**  
**DIRECT TESTIMONY AND EXHIBIT OF CURTIS D. SYMANK, P.E.**

**TABLE OF CONTENTS**

I.	INTRODUCTION .....	3
II.	PURPOSE OF TESTIMONY .....	5
III.	DESCRIPTION OF THE PROJECT .....	6
IV.	STRUCTURE TYPE AND ROW WIDTH .....	7
V.	ENGINEERING CONSIDERATIONS .....	8
VI.	COST ESTIMATES .....	14
VII.	SUMMARY AND CONCLUSION .....	18

**EXHIBIT**

Exhibit CDS-1: Resume of Curtis D. Symank

**PUC DOCKET NO. 48787**  
**DIRECT TESTIMONY AND EXHIBIT OF CURTIS D. SYMANK, P.E.**

**I. INTRODUCTION**

**Q. PLEASE STATE YOUR NAME AND BUSINESS ADDRESS.**

A. My name is Curtis D. Symank, P.E. I am employed by POWER Engineers, Inc. (POWER).  
My business address is 7600B North Capital of Texas Hwy., Austin, Texas 78731.

**Q. WHAT IS YOUR CURRENT OCCUPATION?**

A. I am a Senior Project Manager in the Power Delivery Division for POWER Engineers.

**Q. PLEASE DESCRIBE YOUR EDUCATIONAL AND PROFESSIONAL BACKGROUND.**

A. I graduated from Texas A & M University with a Bachelor of Science in Civil Engineering in 1980. I am a registered professional engineer in Texas (certificate number 65776). For approximately 37 years, I have worked on a host of different transmission, distribution, substation, design and construction projects. Currently, I am the project manager for several high voltage transmission lines and substations, including voltages up to 500-kV HVAC. These transmission projects are in different stages of development in the central and southwestern regions of the United States. Additionally, over my career I've provided line design and project support for well over 100 transmission line projects in Texas for various transmission and distribution providers ranging in voltage from 69-kV to 500-kV, including several lines supporting the Competitive Renewable Energy Zone (CREZ) initiative. Recent projects that I have supported in Public Utility Commission of Texas (PUC or Commission) proceedings include the Brazos Electric Stonebrook 138-kV transmission line in Frisco and the Cross Texas Transmission (CTT) Limestone to Gibbons Creek 345-kV transmission line, which was a part of the Houston Import Project.

Further details of my educational and professional qualifications are outlined in Exhibit CDS-1 attached hereto.

1   **Q.     PLEASE STATE YOUR CURRENT JOB RESPONSIBILITIES.**

2   A.   POWER is based in Hailey, Idaho and, among other things, provides transmission line  
3       design and engineering services nationally to various utilities. As a project manager for  
4       POWER, I provide professional services related to project management, engineering  
5       design, and construction related support associated with electric transmission facilities. I  
6       am responsible for organizing and managing project teams of various types to achieve the  
7       design and associated scope of transmission projects and ensuring that the designs address  
8       the provisions and requirements of applicable engineering regulations, guidelines, and  
9       standards. This scope of work includes cost estimates, engineering calculations,  
10      procurement support, structure design requirements, material specifications, construction  
11      documents, construction support and oversight, and project close-out records. POWER  
12      also provides our clients with a variety of services related to transmission maintenance and  
13      operations functions. In recent years, a large part of my experience has been supporting the  
14      development of potential new, long-haul projects in the midwest and southwestern United  
15      States. This effort has included conceptual and detail design, cost estimates, routing  
16      support, and providing or supporting expert witness testimony for projects in regulatory  
17      proceedings.

18   **Q.     HAVE YOU TESTIFIED PREVIOUSLY BEFORE THE COMMISSION?**

19   A.   Yes, I testified in Docket Nos. 37448, 38354, 44649, and 44060.

20   **Q.     ON WHOSE BEHALF ARE YOU TESTIFYING IN THIS PROCEEDING**

21   A.   I am testifying on behalf of the co-applicants LCRA Transmission Services Corporation  
22       (LCRA TSC) and AEP Texas Inc. (AEP Texas). LCRA TSC and AEP Texas are filing an  
23       application in this docket as Joint Applicants, and have solicited POWER's support to  
24       address certain aspects of the Bakersfield to Solstice 345-kV Transmission Line Project  
25       (Project). My testimony will provide or support technical elements of the Application on  
26       behalf of both LCRA TSC and AEP Texas.

1 **Q. WHAT QUALIFIES YOU TO REPRESENT THE APPLICANTS IN THIS**  
2 **CERTIFICATE OF CONVENIENCE AND NECESSITY (CCN) APPLICATION**  
3 **AND ASSOCIATED PROCEEDINGS?**

4 A. As noted in my resume, Exhibit CDS-1, I was employed by the Lower Colorado River  
5 Authority (LCRA) in the transmission line design group and supported the design and  
6 construction of transmission lines for a number of years until departing in 2013. My work  
7 at LCRA included supporting the routing, design, and construction of several of the LCRA  
8 TSC CREZ projects. My duties at POWER currently include both client management and  
9 project management of LCRA TSC projects. POWER is also actively engaged as one of  
10 the leading design consultants for both LCRA TSC and AEP Texas. POWER has a number  
11 of design teams supporting both clients at any given time, and is familiar with the design  
12 processes and overall operations of both companies in Texas. POWER is currently  
13 supporting a number of projects for AEP Texas, and has historically supported AEP Texas  
14 in many of their 345-kV designs.

15 **II. PURPOSE OF TESTIMONY**

16 **Q. WHAT IS THE PURPOSE OF YOUR TESTIMONY?**

17 A. The purpose of my testimony is to describe the engineering, design, and cost aspects of the  
18 Project, including:

- 19 (1) the design of the proposed facilities;  
20 (2) the proposed transmission line structures and right-of-way (ROW) widths;  
21 (3) the proposed station expansions;  
22 (3) engineering considerations and permits for the proposed facilities; and  
23 (4) estimated costs for the proposed facilities.

24 **Q. WHAT PORTIONS OF THE APPLICATION DO YOU SPONSOR?**

25 A. I sponsor the responses to Questions 5, 7 and 13 in the Application and Attachment 3. I  
26 also co-sponsor the response to Questions 4, 6, 14, 17, 20, 23 and Application Attachment  
27 1 (Section 1). Please see Exhibit SS-5 of Ms. Sonya Strambler's testimony for complete  
28 sponsorship of the Application.

1     **Q.    WERE YOUR TESTIMONY AND THE PORTIONS OF THE APPLICATION**  
2           **YOU SPONSOR PREPARED BY YOU OR BY KNOWLEDGEABLE PERSONS**  
3           **UPON WHOSE EXPERTISE, JUDGMENT, AND OPINIONS YOU RELY IN**  
4           **PERFORMING YOUR DUTIES?**

5     A.    Yes, they were.

6     **Q.    IS THE INFORMATION CONTAINED IN YOUR TESTIMONY AND THE**  
7           **PORTIONS OF THE APPLICATION YOU SPONSOR TRUE AND CORRECT TO**  
8           **THE BEST OF YOUR KNOWLEDGE AND BELIEF?**

9     A.    Yes, it is.

10                           **III.    DESCRIPTION OF THE PROJECT**

11    **Q.    PLEASE DESCRIBE THE PROJECT.**

12    A.    LCRA TSC and AEP Texas propose to construct, own, and operate a new double-circuit  
13           345-kV electric transmission line in Pecos County, Texas. LCRA TSC will construct  
14           additions to the existing Bakersfield Station to accommodate the new line. AEP Texas will  
15           expand the existing 138-kV Solstice Switch Station with the construction of a new 345-kV  
16           station yard adjacent to it at the western termination of this Project. The double-circuit  
17           transmission line component of the Project will connect the new 345-kV double-circuit  
18           facilities at the two stations, with the line ownership being split at approximately the  
19           midpoint of the route selected by the Commission. AEP Texas and LCRA TSC will each  
20           independently construct, own, and operate their respective portions of the Project, with  
21           AEP Texas owning the western and LCRA TSC owning the eastern “halves” of the Project.  
22           The structure closest to the middle of the approved route will be a deadend structure owned  
23           by AEP Texas. LCRA TSC’s ownership will extend from the east to the point at which its  
24           conductors connect to AEP Texas’ deadend structure. During or after the hearing,  
25           Applicants will provide specific details about the structure location of ownership transition  
26           for the routes under primary consideration at that juncture. The Project will be  
27           approximately 68 to 92 miles in length, depending on the route approved by the  
28           Commission.

1 **IV. STRUCTURE TYPE AND ROW WIDTH**

2 **Q. WHAT TYPICAL STRUCTURE TYPE IS PROPOSED FOR THIS PROJECT?**

3 A. LCRA TSC and AEP Texas propose to construct the Project with 345-kV double-circuit  
4 lattice steel towers, typically 110 to 185 feet above ground. If ordered otherwise by the  
5 PUC, or in constrained areas such as, but not limited to, transmission line crossings,  
6 pipeline crossings, and in proximity to airports or heliports, LCRA TSC and AEP Texas  
7 could use shorter than typical, taller than typical, or alternative structure types including  
8 lattice H-frames, steel poles, or steel H-frames. Because of the Project's December 2020  
9 energize date and critical designation in this mostly rural project area, consisting of  
10 generally moderate topography, it is more conducive to the use of lattice towers. As noted  
11 above, some locations or design constraints may introduce the need for other types or  
12 special structure designs. There are certain adjacent transmission line, highway, railroad,  
13 and pipeline crossings in the Project area that may require the use of specific steel pole or  
14 H-frame based designs.

15 **Q. WHAT TYPICAL ROW WIDTH IS PROPOSED FOR THE PROJECT?**

16 A. The typical minimum ROW width for a new double-circuit 345-kV transmission line on  
17 lattice steel structures of the type that will be used by LCRA TSC and AEP Texas is 150  
18 feet using spans that range from approximately 900 to 1,500 feet. This ROW width is  
19 necessary for safe access to the transmission line structures and to provide the necessary  
20 clearances between the conductor and structures and vegetation outside of the controlled  
21 ROW.

22 A slightly wider width may be required in isolated locations based on design  
23 constraints determined in the field during detailed design, such as the spanning of a pipeline  
24 corridor containing multiple pipelines or spanning of multiple crossings, such as a highway  
25 and another transmission line or a pipeline.

26 Where proposed segments parallel other existing ROW or easements such as roads,  
27 railroads, and/or electric distribution line, LCRA TSC and AEP Texas plan to acquire an  
28 independent easement adjacent to the other existing infrastructure ROW or easement.

29 Actual easement widths will be determined during the detailed design phase of the

1 Project. Access easements and/or temporary construction easements may be needed in  
2 some areas as well.

3 **Q. DO LCRA TSC AND AEP TEXAS PLAN TO UTILIZE ANY OTHER EXISTING**  
4 **ROW OR EASEMENTS FOR THE PROPOSED TRANSMISSION LINE?**

5 A. No. Where proposed segments parallel an existing transmission line, LCRA TSC and AEP  
6 Texas plan to acquire an independent easement adjacent to the existing transmission line  
7 easement for placement of the proposed transmission line.

8 One exception has been identified that would result in the ability of AEP Texas and  
9 LCRA TSC to utilize common access to the new transmission line from an existing AEP  
10 Texas transmission line. Several segments in the northern portion of the Project area  
11 parallel to the extent possible an existing AEP Texas transmission line that is currently in  
12 the process of a multi-phased rebuild. For these segments, if selected, the ongoing rebuild  
13 construction can provide most of the required access to structure locations for the  
14 construction of the proposed 345-kV transmission line. This advantage has been  
15 recognized and a reduced ROW construction cost was estimated for Segments F, M, R, W,  
16 X, and Y, which are parallel and adjacent to the line being rebuilt by AEP Texas.

17 LCRA TSC and AEP Texas do not contemplate the joint use of any adjacent  
18 pipeline ROW or easements for this line, although some pipeline crossing will be required.  
19 Construction crossings will be evaluated on a case by case basis to accommodate the  
20 necessary construction activities.

21 **V. ENGINEERING CONSIDERATIONS**

22 **Q. WHAT ENGINEERING CONSIDERATIONS WILL BE USED IN THE DESIGN**  
23 **OF THE PROJECT?**

24 A. LCRA TSC and AEP Texas will design the Project to meet or exceed industry-accepted  
25 standards and specifications for operating the transmission facilities in a safe and reliable  
26 manner, including the National Electrical Safety Code (NESC). The Project will be  
27 constructed in a manner that complies with all state and federal statutes and regulations  
28 applicable to transmission line construction and operation. Furthermore, both LCRA TSC

1 and AEP Texas have well established proven engineering and design standards for 345-kV  
2 facilities that will be used for the design of the Project.

3 In addition, the proposed transmission line will be designed and constructed by both  
4 LCRA TSC and AEP Texas for live-line maintenance. As a result, the design will include  
5 consideration of OSHA Minimum Approach Distances (MAD) for framing geometry,  
6 structure design, and hardware specifications.

7 **Q. DID YOU GIVE CONSIDERATION TO APPARENT EXISTING OIL AND GAS**  
8 **FACILITIES DURING DEVELOPMENT OF THE ALTERNATIVE ROUTES**  
9 **FOR THE PROJECT?**

10 A. Yes. An effort was made to avoid apparent facilities, such as existing wellheads, abandoned  
11 wells, pressure vessels, and oil storage tanks. This review was based on field  
12 reconnaissance from public rights of way and aerial imagery. It should be noted that in  
13 some situations the exact locations of oil and gas infrastructure cannot be determined with  
14 certainty due to discrepancies between aerial imagery and publicly available well and  
15 pipeline location data, particularly with respect to plugged wells or abandoned facilities.

16 The intent during route segment development, segment review, and application  
17 preparation was to allow a safety buffer to any identifiable above ground oil and gas  
18 infrastructure. For apparent above-ground facilities, a buffer of 150 feet or more was the  
19 routing intent, with a preferred buffer of 250-300 feet if sufficient space was available  
20 without significantly impacting other routing constraints.

21 **Q. HOW WILL THE FINAL DESIGN ALIGNMENT BE DETERMINED FOR THE**  
22 **ROUTE APPROVED BY THE COMMISSION?**

23 A. Upon Commission approval of the route, engineers for LCRA TSC and AEP Texas will  
24 begin final detailed design of the Project and develop an alignment based on the approved  
25 route. This process will involve gathering detailed survey information, including locations  
26 of above-ground, at-grade, and sub-surface constraints and precise property boundary and  
27 easement locations, as well as any locations of environmental and cultural resources.

1   **Q.    WILL LCRA TSC AND AEP TEXAS WORK WITH LANDOWNERS TO MAKE**  
2       **ROUTE ADJUSTMENTS FOLLOWING THE COMMISSION'S APPROVAL OF**  
3       **A ROUTE?**

4    A.    Yes. In accordance with direction set forth in the Commission's order, LCRA TSC and  
5       AEP Texas will work with landowners on routing modifications during the design phase  
6       of the Project.

7   **Q.    IS IT TYPICAL FOR UTILITIES TO MAKE ROUTE ADJUSTMENTS**  
8       **FOLLOWING THE COMMISSION'S APPROVAL OF A ROUTE FOR**  
9       **ENGINEERING REASONS?**

10   A.    Yes. During the CCN application developmental phase of a project, primary segments are  
11       developed based on aerial imagery, georectified LiDAR (terrain) data, appraisal district  
12       parcel boundaries, and other publicly available utility data. For example, during CCN  
13       application development for this Project, oil and gas development activity continued to  
14       occur in a rapid manner. At least one of the preliminary alternative route segments had to  
15       be adjusted when LCRA TSC and AEP Texas became aware of active oil field  
16       development within the proposed ROW of a route segment.

17           During the detailed design phase after the final route is approved, the project design  
18       teams will gather detailed survey information, including locations of above-ground, at-  
19       grade, and sub-surface constraints, precise property boundary locations, a list and location  
20       of all easements located on each property, and precise locations of any environmental and  
21       cultural resources. This process of gathering final design and updated information for the  
22       Commission-ordered route regularly identifies new project constraints, particularly in  
23       active oil field development areas such as this or areas with a high number of sub-surface  
24       constraints that can often be in a different location than recorded in previously-reviewed  
25       data files and cannot be verified without entering upon private property and performing  
26       field verification, and which may be newly located and constructed during the pendency of  
27       an application before the ROW for the approved route can be obtained.

28           The results of the more detailed survey information, including more accurate  
29       location of existing constraints and new constraints constructed during or after the CCN  
30       application phase, must be given consideration to determine the final alignment of the

1 transmission line and have the potential to result in route adjustments between the CCN  
2 application phase and the construction phase of the Project.

3 The ability to make route adjustments for engineering reasons is particularly  
4 important in study areas that are congested with existing infrastructure, or rapidly  
5 developing with above-ground and/or underground infrastructure. Examples of these types  
6 of infrastructure include oil and gas wells and associated field gathering lines, and  
7 petroleum pipelines.

8 As noted above, the Bakersfield to Solstice project area is ever-changing due to  
9 growth in the oil and gas development and, more specifically, the rate of its growth. In one  
10 instance, modifications were required to a preliminary alternative route segment (which  
11 was clear during initial site visits) as a result of recently constructed oil and gas  
12 infrastructure within the proposed ROW of the preliminary alternative route segment.  
13 Given the preliminary nature of the public data available during the CCN application phase  
14 of the Project, its potential inaccuracies, and the pace of oil and gas development in this  
15 study area, LCRA TSC and AEP Texas request that the Commission consider adopting  
16 ordering language giving LCRA TSC and AEP Texas limited reasonable flexibility to  
17 modify the approved route to the minimum extent necessary to avoid engineering  
18 constraints encountered along the ROW of the Commission approved route, consistent with  
19 good utility practice and the Commission's notice rules. Such language will reduce the risk  
20 of cost increases due to unnecessary construction or mitigation and to project schedule  
21 delays due to the time required to find other alternatives and return to the Commission with  
22 a request to modify the ordered route.

23 **Q. PLEASE DESCRIBE THE TYPICAL CONSTRUCTION, OPERATION, AND**  
24 **MAINTENANCE PROCESS FOR A TRANSMISSION LINE AND STATIONS OF**  
25 **THE TYPE PROPOSED FOR THE PROJECT.**

26 A. During construction, transmission line projects of this type require surveying, ROW  
27 clearing, foundation installation, structure assembly and erection, conductor and shield  
28 wire installation, and cleanup. Following construction, LCRA TSC and AEP Texas will  
29 perform periodic inspection of the ROW, structures, wires, and station equipment.

30 The stations will require a graded site pad and access road with construction

consisting of vegetation removal (if necessary), cut and fill of existing soils, and the addition of select fill and compacted crushed limestone. Following site preparation, a perimeter fence, foundations, ground grid, electrical equipment, support structures, and a control building will be installed. After all facilities are installed, a final surface layer of gravel will be added, and cleanup will occur when construction is complete. Note that the expansion of the Bakersfield Station will require less construction than the construction of the new 345-kV Solstice Switch Station. These activities are described further in Sections 1.4 and 1.7 of the EA.

**Q. DO LCRA TSC AND AEP TEXAS MITIGATE THE POTENTIAL IMPACTS OF THE CONSTRUCTION, OPERATION, AND MAINTENANCE OF TRANSMISSION LINES ON THE PUBLIC?**

A. Yes. Both AEP Texas and LCRA TSC utilize a number of practices to mitigate the impacts of vegetation removal, construction, and maintenance. These practices are discussed in detail in Section 1 of the EA.

**Q. WILL ANY ADDITIONAL PERMITS OR APPROVALS BE REQUIRED FOR THE PROJECT AND, IF SO, WHEN WILL THEY BE OBTAINED?**

A. Yes. Following Commission approval of the Project, permits or other agency approvals will be required and will be obtained prior to construction during the design phase of the Project. Permits or regulatory approval may be required from the following entities:

- Texas Department of Transportation (TxDOT)
- Texas Commission on Environmental Quality (TCEQ)
- United States Army Corps of Engineers
- United States Fish & Wildlife Service (USFWS)
- Texas Historical Commission (THC)
- Railroad Owners

The potential permits or regulatory approvals are described in more detail in Section 1.3 of the Environmental Assessment (EA).

1 **Q. WHAT COORDINATION ACTIVITIES WILL LCRA TSC AND AEP TEXAS**  
2 **PERFORM TO ADDRESS THE EXISTENCE OF STEEL PIPELINES CARRYING**  
3 **HYDROCARBONS NEAR THE ORDERED ROUTE?**

4 A. After design surveys are complete and pipeline locations are known, to the extent practical,  
5 line design will proceed to establish alignments, structure locations, and structure heights.  
6 LCRA TSC and AEP Texas will then coordinate with these pipeline owners and operators  
7 in accordance with the Commission's final order.

8 **Q. WHAT EXPANSION IS REQUIRED AT THE LCRA TSC BAKERSFIELD**  
9 **STATION TO ACCOMMODATE THE PROJECT?**

10 A. The Bakersfield Station expansion will include the following:

- 11 • station A-frame structures
- 12 • transmission line circuit breakers
- 13 • switches
- 14 • transmission line surge arresters
- 15 • transmission line capacitance coupled voltage transformer (CCVTs)
- 16 • transmission voltage level (345-kV) electric bus
- 17 • related line termination facilities

18 **Q. WHAT EXPANSION IS REQUIRED AT THE AEP TEXAS SOLSTICE SWITCH**  
19 **STATION TO ACCOMMODATE THE PROJECT?**

20 A. The Solstice Switch Station will include the following:

- 21 • two 600 MVA 345/138-kV autotransformers
- 22 • reactors
- 23 • station A-frame structures
- 24 • transmission line circuit breakers
- 25 • switches
- 26 • transmission line surge arresters
- 27 • transmission line CCVTs
- 28 • transmission voltage level (345-kV and 138-kV) electric buses
- 29 • related line termination facilities

1 **VI. COST ESTIMATES**

2 **Q. WHAT ARE THE ESTIMATED COSTS FOR THE PROJECT?**

3 A. The total estimated costs for the Bakersfield to Solstice double-circuit transmission line  
4 range from approximately \$150 million to \$195 million, with route lengths ranging from  
5 approximately 68 to 92 miles. The Bakersfield Station improvements are estimated to cost  
6 approximately \$6,500,000. The Solstice Switch Station improvements are estimated to  
7 cost approximately \$38,500,000. The estimated costs are presented in Attachment 3 to the  
8 Application.

9 **Q. WHAT INFORMATION DID YOU USE AS A BASIS FOR GENERATING THE**  
10 **COST ESTIMATES?**

11 A. I used information from a variety of sources, including segment data from the EA and  
12 geographic information system (GIS) analysis, preliminary designs and costs from several  
13 sources available to POWER including industry vendors, similar project experience,  
14 LCRA TSC and AEP Texas vendors and contractors familiar with the project area, style of  
15 construction, and industry trends.

16 Both LCRA TSC and AEP Texas have internal budget planning and estimating  
17 processes. POWER considered feedback from both utilities in addition to other sources to  
18 arrive at a Project estimating basis applicable to the project area and type of construction.  
19 This information was applied to the proposed segments and routes to arrive at cost  
20 estimates for each route that are in my opinion, reasonable, applicable to the project area,  
21 recognize publicly known information associated with proposed segments and routes, and  
22 do not unduly favor or create bias against any given segment or route.

23 After POWER created estimates for the proposed segments and routes, both LCRA  
24 TSC and AEP Texas reviewed the estimates for general conformance with their internal  
25 systems for estimating and budgeting projects. Feedback was considered for adjustments  
26 during the development of the final estimates included in the Application. Estimates are  
27 based on current pricing.

1    **Q.     WHAT METHOD DID YOU USE FOR GENERATING THE REAL ESTATE**  
2       **COST ESTIMATES FOR THE TRANSMISSION LINE PORTION OF THE**  
3       **PROJECT?**

4    A.    The real estate cost estimates for the Project were developed using the following steps:

- 5           • I estimated the number of parcels crossed by the estimated transmission line  
6           easement for each mile (approximately 1 parcel per mile) and determined the  
7           estimated easement acreage for each segment.
- 8           • I obtained general feedback from both LCRA TSC and AEP Texas about average  
9           county tax appraisal and market values in the project area. I then used this feedback  
10          along with experience to arrive at an estimating value for easements required for  
11          the Project on a cost per acre basis. This value includes a factor for additional costs  
12          associated with items not specifically included in the estimated cost of the easement  
13          on a per parcel basis. These items include, but are not limited to, temporary  
14          construction easements, construction damages, temporary or permanent off ROW  
15          access easements, changes in land use and/or land value during the period of time  
16          between the preparation of the estimate and acquisition, and additional  
17          compensation required as an outcome of litigation.
- 18          • Easement costs were estimated for each segment by multiplying the estimated  
19          easement acreage for the segment by the average estimated easement cost value per  
20          acre for that segment.
- 21          • I included an easement acquisition cost for each parcel that will need to be acquired  
22          (estimated at one per mile). This cost was based on the experience of LCRA TSC  
23          and AEP Texas in obtaining ROW.

24   **Q.     DID YOU ADJUST THE REAL ESTATE COST ESTIMATES FOR PORTIONS OF**  
25       **THE PROJECT ON UNIVERSITY LANDS?**

26   A.    Yes. The real estate cost estimates for segments wholly or partially located on University  
27   Lands (UL) were adjusted as follows:

- 28          • The number of easement transactions was adjusted to acknowledge the fact that one  
29          transaction will be developed for all UL property crossed and not individual  
30          transactions for each individual parcel or tract crossed, thus reducing the number  
31          of transactions that are required for segments and routes that utilize UL.
- 32          • For estimating purposes, a value somewhat higher than the latest cost figures  
33          currently published by UL, assuming the potential for an increase after the  
34          Application was filed.

1 **Q. DOES THE TRANSMISSION LINE REAL ESTATE ESTIMATED COST PER**  
2 **ACRE DETERMINE THE ROW AND LAND ACQUISITION COST FOR A**  
3 **PARCEL THAT LCRA TSC AND AEP TEXAS WILL ACTUALLY PAY A**  
4 **PRIVATE LANDOWNER?**

5 A. No. Upon selection of a route by the Commission, LCRA TSC and AEP Texas will  
6 determine the precise placement of the alignment on each parcel and use property values  
7 based on an independent appraisal to develop actual easement acquisition costs for each  
8 privately held parcel. The ROW costs presented in the Application that are used for Project  
9 cost estimating purposes should not be viewed or considered as appraised, calculated costs  
10 to obtain individual easements across individual parcels. The data used to estimate ROW  
11 costs for the Project was based primarily on the experience and market assessments of  
12 LCRA TSC and AEP Texas real estate staff. I did not request nor receive any specific  
13 appraisal or estimating calculations from either utility. I did rely on their feedback as  
14 qualified, knowledgeable professionals with access to publicly available, reproducible, and  
15 verifiable information related to ongoing activity and real estate values in the Project area.  
16 I also applied a consistent method for the purpose of comparing relative overall cost  
17 estimates among all the proposed alternative routes.

18 **Q. DO YOU FIND THE COST ESTIMATES TO BE REASONABLE?**

19 A. Yes. The estimates were prepared using input from POWER, LCRA TSC, and AEP Texas  
20 staff with expertise in different disciplines, including real estate, environmental, and  
21 construction. I reviewed the components of the cost estimates and found the cost estimates  
22 for the various routes to be reasonable and consistent with engineering practices and market  
23 conditions in effect on the filing date.

24 **Q. ARE THERE FACTORS THAT COULD AFFECT THE ESTIMATED COSTS**  
25 **PRESENTED IN THE APPLICATION?**

26 A. Yes. Changes in market conditions, including construction labor and/or the cost of metals  
27 or other natural resources, as well as changes in land use, could increase or decrease costs  
28 above or below the estimates contained in the Application. Over time, these and other

1 factors could change, resulting in increased or decreased actual costs compared to the  
2 estimated costs.

3 **Q. DOES OIL AND GAS DEVELOPMENT IN THE PROJECT AREA HAVE THE**  
4 **POTENTIAL TO FURTHER IMPACT COST OR SCHEDULE?**

5 A. Yes. As noted earlier in my testimony regarding engineering constraints, the addition of  
6 new wells, associated production facilities, and pipelines could impact much of the Project  
7 area. Any new development that occurs during the CCN application process which  
8 interferes with an approved route segment will require adjustments to the segment since  
9 transmission line easements are not yet acquired for any proposed segment of the Project.  
10 This adds potential risk from both cost and schedule perspectives, particularly when the  
11 ability to make adjustments is impacted by the nature of constraints in the area or other  
12 factors.

13 **Q. WILL LCRA TSC'S AND AEP TEXAS' ACTUAL CONSTRUCTION COSTS FOR**  
14 **THEIR RESPECTIVE PORTIONS OF THE PROJECT BE THE SAME?**

15 A. No. While both utilities use similar design and construction practices that meet acceptable  
16 industry standards, they are different. Each utility uses its own specific designs for  
17 structures, hardware, ROW clearing, and ROW construction. Each utility also has different  
18 business practices, procurement procedures, and construction strategies that are adjusted  
19 to meet specific Project scope and schedule needs. In addition, there may be different types  
20 of constraints encountered that result in different adjustments to detailed design on the two  
21 halves of the Project. So, while the cost estimates are reasonable and acceptable, I have no  
22 expectation that the final costs will be the same for the Applicants respective portions of  
23 the Project.

24 **Q. DID THE ELECTRIC RELIABILITY COUNCIL OF TEXAS (ERCOT) REVIEW**  
25 **OF THE PROJECT INCLUDE ESTIMATED COSTS?**

26 A. Yes. During the ERCOT evaluation of the Project in 2016-2018, LCRA TSC and AEP  
27 Texas provided ERCOT with reasonable estimates of the cost to construct the Project that  
28 were based on a general understanding of the Project area without the benefit of a detailed  
29 evaluation of area constraints or specific design considerations (particularly with respect

1 to substation interconnection). The cost estimates provided by the utilities to ERCOT on a  
2 per mile basis (\$2.23 million per mile) are reasonably similar to the average of the cost  
3 estimates for each route of the Project that I have estimated on a per mile basis (\$2.15  
4 million per mile), particularly in light of the limited information available to the utilities  
5 when such cost estimates were developed.

6 **VII. SUMMARY AND CONCLUSION**

7 **Q. PLEASE SUMMARIZE YOUR CONCLUSIONS.**

8 A. LCRA TSC and AEP Texas propose to design, construct, own, and operate their respective  
9 portions of a new double-circuit 345-kV electric transmission line and associated station  
10 expansions in the Bakersfield Station (LCRA TSC) and Solstice Switch Station (AEP  
11 Texas) in Pecos County. The Project is the Bakersfield to Solstice component of what has  
12 been studied and identified as the Far West Texas family of projects. The Project will be  
13 approximately 68 to 92 miles in length, depending on the route approved by the  
14 Commission.

15 LCRA TSC and AEP Texas propose to construct the Project with 345-kV double-  
16 circuit lattice towers on typical 150-foot wide easements.

17 The Project cost estimates are reasonable and consistent with engineering practices  
18 and market conditions in effect on the filing date.

19 **Q. DOES THIS CONCLUDE YOUR TESTIMONY?**

20 A. Yes, it does.



## **CURTIS SYMANK, P.E.**

### **SENIOR PROJECT MANAGER**

#### **YEARS OF EXPERIENCE**

37

#### **EDUCATION**

- > B.S., Cum Laude, Civil Engineering, Texas A&M University, 1980

#### **AREAS OF EXPERTISE**

- > Analysis, design and construction of high-voltage transmission facilities
- > Engineering direction for transmission design and construction
- > Complete technical support for utility project development
- > Engineering direction for high-voltage substation facilities

#### **LICENSING**

- > P.E., Civil/Structural: Texas

#### **PUC TESTIMONY (TEXAS)**

- > Brazos Electric 44060 Stonebrook 138 kV OH/UG (City of Frisco)
- > CTT 44649 Limestone to Gibbons Crk 345 kV (Houston Import)
- > LCRA 38354 McCamey D to Kendall 345 kV (CREZ)
- > LCRA 37448 Gillespie to Newton 345 kV (CREZ)

#### **AFFILIATIONS**

- > Member, American Society of Civil Engineers
- > Member, IEEE
- > Member, PMI

#### **EXPERIENCE SUMMARY**

Mr. Symank is a seasoned project manager and project engineer for complex electrical facilities, including transmission, distribution, substation, HVAC and HVDC. He is a specialist in high-voltage transmission line design and construction. Mr. Symank also provides support in the routing and regulatory areas for challenging projects. He supports POWER's environmental teams who analyze routing alternatives, conduct public meetings, and prepare routing studies and environmental assessments.

His background includes acting as a utility company supervising engineer and senior engineer, and as an engineering supervisor for a large transmission and distribution engineering/construction firm. He has also served as a registered professional engineer with Lower Colorado River Authority (LCRA) and Brazos Electric Power Cooperative. With LCRA, Mr. Symank was responsible for engineering direction of several large 345kV transmission projects in the Southwest, involving overall design and construction oversight, legal and acquisition services, and PUC testimony.

He has additional experience in operations, construction and project management for oil and gas production facilities.

#### **Confidential Client & Project, HVAC 500 kV**

Project Manager responsible for POWER's line design engineering teams supporting a confidential project. The project is an E+PC program, with POWER being the Owner's Engineer and detailed design engineer working in close coordination with the owner, vendors, and contractor.

#### **Southwestern Power Group (SunZia), SunZia HVAC 500 kV Line, New Mexico and Arizona**

Project Manager responsible for Owners Engineering and detail design for the final design and construction of an approximately 500-mile long 500 kV AC overhead and underground transmission line in New Mexico and Arizona. The project is an E+PC program, with POWER working as the SunZia Owner's Engineer and as detailed design engineer providing support for design and construction. During the later stage of development POWER's role transitioned from OE in an EPC program to engineer in an E+PC development model.

#### **Clean Line Energy Partners, Plains & Eastern 600 kV HVDC Line, Multiple States**

As Project Director, Mr. Symank was responsible for POWER's team providing Owners Engineer services for the entire project which consisted of one major 600 kV HVDC transmission line, associated AC transmission lines, three HVDC convertor stations, ancillary operations and maintenance

projects, regulatory and legal support, as well as other EPC contract execution activities. As Project Manager Mr. Symank was responsible for conceptual and preliminary design for this 600 kV HVDC transmission line. The project is a 725-mile, 600 kV HVDC transmission line from the Oklahoma panhandle to Memphis, Tennessee. POWER developed conceptual design information including preliminary design criteria, conductor and OPGW selection, proposed and alternative structures, structure foundations, and structure spotting/line design. POWER also performed preliminary studies for insulation and electrical clearances, economic conductor selection, and EMF/EMI performance. POWER provided Owners Engineering support for the detailed design for the project, including structure design, geotechnical exploration, and other aspects of the project. The project was divided prior to construction with a large portion of the project being sold to another utility.

#### **Clean Line Energy Partners, Grain Belt HVDC Line, Multiple States**

Project manager responsible for preliminary general engineering support for the routing of an approximately 700-mile long 600 kV HVDC overhead transmission line capable of 3500 MW. It is anticipated that the western terminal will be located in Kansas and that the eastern terminal will be located in Indiana. The project is currently pending the state regulatory and legal proceedings in Missouri and Illinois.

#### **Clean Line Energy Partners, Western Spirit 345 kV HVAC Transmission Line, New Mexico**

Project Manager responsible for preliminary general engineering support for the routing of an approximately 140-mile long 345 kV AC overhead transmission line in New Mexico. The project obtained final regulatory approval in New Mexico and is currently under final development after being acquired by Pattern Energy.

#### **Clean Line Energy Partners, Rock Island 600 kV HVDC Transmission Line, Multiple States**

Project manager responsible for routing, regulatory support, and conceptual and preliminary design for a large 600 kV HVDC project, including participating in 17 public meetings and presentations. The Rock Island Line is a 500-mile, 600 kV HVDC transmission line that will deliver 3,500 MW of renewable power from Iowa, Nebraska, South Dakota, and Minnesota to communities in Illinois and other states to the east. POWER's involvement has included preliminary transmission line design, supporting electrical studies, and coordination with governmental agencies and environmental consultants on behalf of Clean Line Energy Partners. Project development is currently suspended.

#### **Brazos Electric Power Cooperative, Frisco Legacy Switch to Stonebrook 138 kV Regulatory and Design Support, Texas**

Mr. Symank has been Project Manager for POWER and a PUC Witness for Brazos Electric on the Frisco Stonebrook project. Brazos Electric required a project to serve customer load growth in Frisco, one of the most rapidly growing areas in the nation. The Stonebrook project includes a station at

existing 138 kV transmission circuits, approximately 3 miles of double circuit 138 kV transmission line, and a new Stonebrook substation.

During the regulatory CCN phase of the project, Brazos engaged POWER for regulatory support to provide estimates for alternative construction; specifically, overhead and underground alternatives. During the CCN process POWER further supported Brazos in a series of studies, estimates, and alternative proposal reviews that resulted in a proposed settlement for consideration by the Public Utility Commission. The proposal included coordinated construction sequencing to facilitate the installation of almost three miles of underground transmission in Frisco's Main Street as the street is rebuilt and expanded. The proposal was ultimately approved by the commission.

POWER's services for this ongoing project include regulatory study support, testimony by three engineering expert witnesses, technical support during settlement negotiations, overhead design, underground design, and substation design. Design is complete, and construction will be completed in the fall of 2018.

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**Garland Power & Light, Multiple Projects, Texas**

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Transmission line project manager, providing engineering and project management support for several projects for this Texas utility's 138 kV and 345 kV transmission system. Garland was both a direct client for Mr. Symank as well as a project partner with Cross Texas Transmission on another major 345 kV project in Texas.

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**Cross Texas Transmission, Limestone to Gibbons Creek 345 kV Transmission Project, Texas**

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Transmission line project manager, providing engineering and project management support for several aspects of this portion of the larger Houston Import Project for the CTT/Garland team. Mr. Symank is the project manager for the project support team at POWER, served as the technical engineering Expert Witness for CTT in the CCN proceedings in Texas, and led the detailed design of the project for Power's design team.

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**Denton Municipal Power, 138 kV Transmission Line Upgrades, Texas**

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Transmission line engineering manager, providing engineering support for a major upgrade to this Texas municipality's 138 kV transmission system. Ultimately, Denton proposes upgrades/new construction of twelve substations and seven transmission lines.

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**CPS Energy, Multiple Distribution Projects, Texas**

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Distribution engineering services project manager, providing engineering and project management support for distribution design teams at CPS.

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**Brazos Electric Power Cooperative, 138 kV Transmission Line Facilities, Texas**

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Project manager, providing engineering oversight and support for multiple projects to this Texas utility's 138 kV transmission system, including technical regulatory support and project management support on projects.

#### **Lower Colorado River Authority, Transmission Line Facilities, Texas**

Project manager, providing engineering support for a multiple line and substation projects to this Texas utility's transmission system, including technical support, project management, regulatory support, and client management support.

#### **Lone Star Transmission, Transmission Line Facilities, Texas**

Project manager, providing engineering support for multiple projects to this Texas utility's transmission system, including technical support and project management support on projects.

### **PREVIOUS WORK HISTORY**

#### **Engineering Supervisor, Transmission Line Design, Lower Colorado River Authority, Texas**

Supervisor for a team of engineers and technicians tasked with design and construction oversight for high voltage transmission lines. Responsible for monitoring work progress for registered professional engineers on the team and consulting firms engaged to perform project work. Responsible for direct supervision of other staff engineers and technicians on the team and the resulting work product. Also responsible for actual design work on selected projects, typically more involved or complicated projects requiring additional focus and experience. Responsible for CREZ CCN project development support including expert witness testimony on major CREZ projects including Gillespie-to-Newton 85-mile 345 kV project and the Big Hill-to-Kendall 140-mile projects. Additional duties included project and budget estimates, technical specifications, standards, supply management support, technical components for regulatory filings, and technical support for easement acquisitions including eminent domain testimony. Responsible for providing technical assessments of proposed development in and near LCRA easements and facilities.

#### **Significant projects and activities:**

- > Flatonia to Yokum 28 mile 138 kV rebuild design supervision
- > Paleface to Kendall 57 mile 138 kV CREZ design oversight
- > Big Hill to Kendall ~140 mile 345 kV design oversight, legal and acquisition support
- > Clear Springs to Hutto 85 mile 345 kV construction support and legal support
- > CREZ PUC CCN Testimony, Big Hill to Kendall 345 kV transmission line
- > CREZ PUC CCN Testimony, Gillespie to Newton 345 kV transmission line
- > Kendall Substation expansion 345 kV and 138 kV multiple line adjustments and cut-ins
- > Fayetteville to Bellville So. 28.2 mile 138 kV transmission line rebuild

- > Long Term Contract Team member for structures, conductor, insulators, hardware
- > Long Term Contract Team member for Professional Services at LCRA
- > Eminent domain testimony, Jack Furman Substation, Rim Rock to Jack Furman
- > Escarpment to Manchaca 4.7 mile 138 kV transmission line design and eminent domain testimony
- > Friendship to Escarpment 4.2 mile 138 kV transmission line (overhead and underground)
- > Lampasas to Evant 26.1 mile 138 kV transmission line re-conductor/upgrade
- > McNeil to Gilleland Creek 7.5 mile 138 kV transmission line
- > Buchanan to Lampasas 24.8 mile 138 kV transmission line
- > SH130/SH195 Interchange TXDOT Adjustment of DC 138 kV over interchange
- > Wells Branch Substation multiple 138 kV transmission line cut-in
- > Kendall to Cagnon 345 kV construction oversight and eminent domain testimony
- > Kendall Substation 345 kV and 138 kV multiple line cut-ins
- > Kendall to Miller Creek 39.8 mile 138 kV transmission line rebuild/upgrade

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#### **Senior Engineer, Transmission Line Design, Lower Colorado River Authority, Texas**

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Senior transmission engineer for analysis, design, and construction of high voltage electrical transmission facilities along with some lower voltage distribution facilities. Responsible for final engineering designs, limited support to other team members, project analysis and proposals, customer interfaces on projects as necessary, project engineering support, permit exhibit preparation and project construction support for major projects. Participated in vendor analysis for consulting services and construction contractors. Projects included detailed design, estimating and routing support, construction specifications, construction bid tabs, project asset listings, and contract preparation support. Extensive use of PLS-CADD. Also active use of AutoCAD and other support software.

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#### **Associate Civil Engineer/Lead Transmission Engineer, Burns & McDonnell Engineering Transmission and Distribution Division, Texas**

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Group lead over a team of structural engineers specializing in analysis, design, and construction of high voltage electrical transmission facilities, including transmission lines and substations, along with lower voltage distribution systems. Responsible for final engineering designs, guidance and supervision of younger team members, project analysis and proposals, client presentations, client relationships, and project management for major projects. Conducted interviews with prospective employees and potential subcontractors to support the office workload. Projects for major clients were located in Texas, Louisiana, Oklahoma, Arkansas, Illinois, and Africa. Projects included detailed design, estimating and routing support, construction specifications, and contract preparation. Also performed construction management duties in support of a significant aviation facility project in the Houston area.

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**Manager of Purchasing and Office Services, Brazos Electric Cooperative, Texas**

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Responsible as Department Manager supervising the purchasing and administrative support staff that was charged with providing services, supplies, materials, and equipment for cooperative activities and facilities. This support included the development of specifications, procedures, and contract administration processes required to meet construction and maintenance schedules. Provided staff supervision and management for a diverse staff including purchasing, contract management, print shop operations, central filing and archive operations, and custodial services personnel. The processes utilized J.D. EDWARDS WORLD Software Purchasing, Inventory, and MRP systems.

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**Project Engineer, Brazos Electric Cooperative, Texas**

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Project Engineer in transmission design. Project engineering and management responsibility for transmission line projects including design, material specifications, construction contracts, and construction review. Also estimating, budgeting, programming for design applications, and management of the CADD system. This assignment included interfacing with team members from other groups for proper planning and coordination required to successfully complete complex construction projects in a timely and cost-effective manner. This assignment also included supervising and working with a team of draftsmen and engineering assistants. During this assignment Mr. Symank also assisted in implementing PLS-CADD as a design tool. Served on the implementation team for the J.D. EDWARDS system, with lead responsibility for implementation of the work order, job cost, inventory, and maintenance work order systems, and a key role in purchasing, fixed assets, and other systems.